

Nonsense, Not Science

A Critique of *Sense About Homeopathy* by Chris Tyler

(London: Sense About Science, 2006)

by

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on behalf of H:MC21

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Introduction

Sense About Homeopathy by Chris Tyler (London: Sense About Science, 2006) is a leaflet published by a charitable trust established to “work with scientists and civic groups to promote evidence and scientific reasoning in public discussion”,¹ and “to promote evidence and good science for the public” (p. 2).² Any organisation claiming to promote good science and scientific reasoning should be scrupulous about scientific accuracy, and this responsibility is even more important in the case of a charity which receives donations on the basis that it serves the public interest. This critique shows that *Sense About Homeopathy* does not consider the evidence impartially, or indeed take into account all the information relevant to a discussion of homeopathy. Nonetheless the leaflet concludes that “The scientific evidence shows that homeopathy acts only as a placebo and there is no scientific explanation of how it could work any other way.” (p. 1).

The failure of *Sense About Homeopathy* to present either good science or sound scientific reasoning would be of less importance were it not for the fact that Sense About Science has supported campaigns against homeopathy, and some of these campaigns have been associated with inappropriate presentations of information. Furthermore, one of the trustees of Sense About Science (Simon Singh) is a science writer and the co-author of *Trick or Treatment?*, a book attacking alternative medicine (and especially homeopathy) published in 2008 (two years after *Sense About Homeopathy*).³ We have published a critique of this book, showing that it also fails to present either good science or sound scientific reasoning, making many of the same errors as this document, though at much greater length.⁴ In this context, the publication of an apparently reliable, but actually scientifically unreliable criticism of homeopathy by Sense About Science suggests an intention to appear impartial whilst actually propagandising against homeopathy.

For this reason, we have considered it vital that this critique be as thorough, detailed and well-supported by evidence as possible, even though it has resulted in a document vastly longer than the one it is analysing. We take very seriously the issue that *Sense About Homeopathy* fails to meet reasonable standards of scientific accuracy and rigour, whilst being the publicly stated position of Sense About Science on the subject of homeopathy. It calls into question the charity’s integrity, and raises concerns about its attempts to influence decision-makers internationally against homeopathy.

Definitions of Terms

One problem we have had to face in discussing *Sense About Homeopathy*, is that Chris Tyler, the author, despite “kind assistance from Sense About Science advisers” (p. 2), either fails to define many of the basic terms used, or uses varying definitions at different points in the leaflet. Given that the clear definition of terms is a fundamental requirement of science, this is unacceptable in a publication intended “to promote evidence and good science for the public” (p. 2).

All these problems of definition are discussed in the course of the analysis, except for one. The word ‘homeopathy’ is used by Tyler with the implication that it refers to homeopathy as a system of medicine, whereas the context almost always indicates that it is actually used to mean homeopathic treatment, or possibly potentised substances. This is the equivalent of using the same word to mean sport in general, a particular sporting activity (such as, football) and the type of ball used. Within the critique, we have made assumptions about what is meant on each occasion, but in Appendix 5 we discuss each use of the word by Tyler in more detail. To increase clarity we will ourselves use the following terms:

- **Homeopathy** – the system of treatment outlined in Hahnemann’s *Organon*, and developed further by subsequent practitioners.
- **Homeopathic treatment** – treatment based on applying the principles of homeopathy, which may or may not involve the use of a potentised substance.
- **Potentisation** – a process of preparation based on dilution and succussion according to the principles of homeopathy. The original material may be derived from an animal, vegetable or mineral source, or from material subjected to electromagnetic activity. ‘Succussion’ is a process of banging the phial of diluted material, as in “given one hundred strong succussions with the hand against a hard but elastic body”.⁵ Insoluble substances first undergo a process of trituration (grinding with a pestle and mortar) with lactose until they are capable of colloidal suspension in a liquid.
- **Potentised substances** – liquid or solid material prepared by the process of potentisation. Their medicinal properties entirely depend on the relationship of their particular actions to the symptoms of the patient, and it is only when they are used according to the principles of homeopathy that they become homeopathic. In this critique we shall use the term ‘potentised substances’.

*Discussion of Page 1**

Introductory Paragraphs

The opening paragraph of *Sense About Homeopathy* begins with the phrase “Homeopathy is marketed as a safe, natural and holistic treatment for a range of ailments and illnesses ...”, and ends with the sentence “Homeopathic products and services have become a large industry” (p. 1). The significance of this is that it represents a *commercial* starting point for Tyler’s argument, rather than a scientific one, with the implication that the system of homeopathy is simply a product of successful marketing. At the same time it fails to put this into a true commercial context. Even homeopathy’s opponents estimate global annual spending on alternative medicine *as a whole* to be £40 billion per year, whereas global annual spending on healthcare as a whole is £2.8 trillion, so homeopathic treatment and the medicines it uses are an industry worth only a fraction of 1.5% of the health industry as a whole. Clearly homeopathic practitioners and their medicines are nothing like a large industry in the field of health.⁶

If the first paragraph of *Sense About Homeopathy* implies that the alleged benefits of the system of homeopathy are commercial, the second implies that its alleged failings are scientific. However, just as the commercial argument depends on not clarifying what “large” really means, so the scientific argument depends on not clarifying what is meant by “science”. Thus the statement that the system of homeopathy “has not been embraced by medical science” assumes that there is such a thing as medical science, but Tyler does not define its principles. Even within orthodox medicine there is dispute about whether it is a science, as W.F. Bynum has pointed out (our emphasis),

Nor would I wish my claim that medicine in 1900 was essentially modern to be taken as meaning that the practice of medicine at that time was unambiguously “scientific,” or that all doctors sought to use contemporary scientific discoveries in their daily practices. *That was true for neither the 1900s nor the 1990s.* The ideas and ideals of science could mean one thing to one person, and something entirely different to another.⁷

Similarly Henrik R. Wulf and others have pointed out that (our emphasis)

deductions from biological theory are often unreliable and ... techniques used in practice must be tested empirically. Clinical practice must not be regarded as applied biological medicine, *and it is necessary to adopt the empiricist approach for the solution of clinical problems.*⁸

* All unacknowledged quotations in this section are from page 1.

Over the last fifty years this “empiricist approach” has been embodied in what is called evidence-based medicine (EBM), but while this leaflet appears to be based on this approach, it actually ignores some of the principles embodied in EBM. We shall look at some of the implications of this in the section on clinical trials.

For now it is important to recognise that the scientific credentials of medicine are uncertain and so Sense About Science is failing in its obligation to provide “help or information on a difficult or controversial area of science” (p. 2) by actively encouraging readers to accept the unsupported premise that orthodox medicine is a science.

In addition to references to “medical science” and “scientific evidence”, the second paragraph also claims that “there is no scientific explanation” for how homeopathic treatment works, other than “that homeopathy acts only as a placebo” (p. 1). The placebo effect is a central argument in this leaflet, with virtually the whole of the second side devoted to this subject rather than to the system of homeopathy itself. As a result it is necessary to look at this definition in detail.

Box 1: “Another way of saying ... Placebo and the placebo effect”

The leaflet defines a placebo as “a prescription that is inert; that is, it does nothing, like a sugar pill or water” (p. 1). It then goes on to define the placebo effect as (our emphasis) “an effect, biological, biochemical or physiological, that *emerges* from an inert treatment because the patient believes it will work” (p. 1). The use of the term “emerges” is significant, because it is an attempt to link real biological, biochemical or physiological effects to a treatment already defined as incapable of producing such effects. At the same time it acknowledges that the placebo effect is not a process but the collective name for a set of observed effects. Neither the causes of the effects nor the mechanisms by which they are produced are known,⁹ and, as the authors of *Trick or Treatment?* put it, “scientists strive to establish the scientific basis of the placebo effect”.¹⁰ In other words, the placebo effect is not a process and has no scientific explanation, and so it cannot form the basis of a scientific explanation of any process of treatment.

The leaflet’s definition of the placebo effect also states that the effects occur after an inert treatment “because the patient believes it will work” (p. 1). It is true that the patient’s expectation of an effect is an important factor in the effect occurring, but there is no absolute connection between expectation and effect. Whilst expectation is *necessary* for the effect to occur, it is not *sufficient* to make sure it does occur. Were expectation a sufficient cause, then any alleged medicine would cure

perfectly all the time. That Tyler is aware of this point is confirmed by the discussion of “repeatability” on the second page.

Given the definition in this leaflet, three key points need to be established before discussion of the placebo effect is relevant to a discussion of homeopathy:

1. *Homeopathic treatment must be shown to be inert*

The placebo effect is defined as occurring after an inert treatment, so any scientific discussion of homeopathy and the placebo effect must include proof that homeopathic treatment is inert. This is a complex issue since it means that both the method and the means have to be shown to be inert. Homeopathic treatment is based on a relationship of the treatment to the symptoms, and it may be delivered through material doses (which are definitely not inert) or potentised substances (some of which must be chemically inert). For homeopathic treatment to be a placebo both the relationship *and* potentisation have to be shown to be incapable of causing a real effect.

2. *Homeopathic treatment must be shown to produce only expected effects*

The placebo effect is related to a patient’s expectation of specific effects, so any scientific discussion of homeopathy and the placebo effect must show that the effects of homeopathic treatment coincide with what the patient expects to happen. This is particularly important because leading texts on homeopathy indicate that the effects of treatment are complex and cannot be predicted even by the homeopath,¹¹ so a scientific approach needs to establish both the actuality of the patient’s expectation, and the source of this expectation.

3. *The effects of homeopathic treatment must not differ significantly from those of a placebo*

The placebo effect refers to real effects, so any scientific discussion of homeopathy and the placebo effect must take into account the nature of the real effects which occur after homeopathic treatment and after a placebo treatment. It should also be noted that

... there is lots of data to show that placebo effects are notoriously unreliable; somebody who responds today may not respond tomorrow; responses are not large in effect size and they are not usually long-lasting.¹²

A significant incidence of long-lasting real effects from homeopathic treatment would indicate that they are caused by something other than the placebo effect.

As will be shown, *Sense About Homeopathy* does not provide any evidence of homeopathic treatment being inert, nor any evidence of a coincidence between patient belief and the effects of homeopathic treatment, nor any evidence of effects of homeopathic treatment being entirely consistent with those of a placebo. It fails, therefore, to present any basis for the assertion that “homeopathy acts only as a placebo”. The contrary evidence that the medicines used by homeopaths are not inert, that expectation is not an important factor, and that the placebo effect differs from that of homeopathic treatment is included in Appendix 1.

Box 2: “Not to be confused ... Proven”

Sense About Homeopathy notes that ‘proving’ is “the method homeopaths use to determine the symptoms a substance causes”. It then follows this with the claim that “scientists use ‘proven’ to describe a statement that is, by logic, necessarily true”, adding (in the third box) that clinical trials can “prove that [medicines] are both safe and effective”. Since clinical trials do not produce conclusions which are “by logic, necessarily true”, clearly this leaflet employs more than one meaning for the term ‘prove’ even before considering what homeopaths mean. In fact, what is not explained is that the word derives from the German verb ‘prüfen’, meaning ‘to test’, and the specialist meaning of ‘to test something and show it is true’ is the exceptional use. The usage retained by homeopaths is the traditional one, as seen in “the proof [test] of the pudding is in the eating”, and “the exception proves [tests] the rule”. Thus a ‘proven’ substance is one which has been tested.

At the same time, in stating that homeopaths test to “determine the symptoms a substance causes (with a view to treating diseases with similar symptoms)”, the leaflet is acknowledging that a homeopathic proving seeks to records *all* the effects of a substance rather than an arbitrary selection of those effects. As such homeopathic provings are intended to establish scientifically valid information on which to base decisions about the use of a substance in the treatment of an individual’s illness. On the other hand orthodox clinical trials test for certain pre-defined effects, which are only a selection of all the effects which a substance can cause. These effects are then arbitrarily categorised as ‘beneficial effects’ and any others as ‘side effects’. Thus “Whether a particular drug action is called a side effect or a desired effect depends on why the drug is being taken.”¹³ Clearly this does not offer a secure scientific basis for understanding the complete action of substances, and the truth of this is evidenced by the fact that drugs are withdrawn even though

trials are supposed to “prove that they are both safe and effective”. In short, the principle underlying homeopathic testing is more scientific than that of orthodox drug testing.

Box 3: “Clinical Trials”

The rationale offered by *Sense About Homeopathy* for the use of clinical trials is that doctors “need to know the difference between the ‘placebo’ effect and a ‘clinical’ effect”. This is an acknowledgment that the ‘placebo’ effect and a ‘clinical’ effect are unidentifiable as such *in themselves*, but are only distinguishable from each other on the basis of knowing that one treatment is inert and the other not inert. Similarly, the leaflet notes that “Sometimes the administration of a pill will coincide with recovery, but not be related to it” (p. 2), but again no explanation is given as to how the effect of a treatment and recovery without treatment can be distinguished *in themselves*. In other words orthodox “medical science” cannot reliably distinguish between the results of different processes of patient improvement, even though this must be a basic requirement of any medical science.

Tyler then goes on to point out that “individual peculiarities will skew the results”,¹⁴ indicating that any comparison of effects from a treatment and a placebo is also open to influence from other factors. The nature of these other factors is not explained, but there can be no true medical science if it cannot incorporate the individuality of patients’ responses. The fact that homeopathic treatment *does* take individuality into account is not mentioned, even though it shows that in principle homeopathy is more scientifically founded than orthodox medicine. Instead *Sense About Homeopathy* states that “the gold standard clinical trial is the randomised trial”, and that, when it comes to medicines, this is able “to prove that they are both safe and effective before they are licensed for use”.

In fact, the evidence shows that this is not true, as we have already noted. Indeed David L. Sackett and others have pointed out that “even excellent external evidence may be inapplicable to or inappropriate for an individual patient”, and “good doctors use both individual clinical expertise and the best available external evidence, and neither alone is enough”.¹⁵ *Sense About Homeopathy* makes no mention of the need to support evidence from clinical trials with evidence from clinical practice, even though it is the observations made in clinical practice which initiate the process of treatments being withdrawn as unsafe. As such it rejects the principles of EBM and relies on the use of clinical trials as a sole authority of effectiveness and safety, an approach considered inadequate

in orthodox medicine. It is, therefore, unacceptable and unscientific to suggest that such trials can legitimately be used as the sole method of establishing the effectiveness of homeopathic treatment.

In the light of this, it is also important to note that no definition of effectiveness is provided in this leaflet, even though this is an essential prerequisite for any truly scientific assessment of a therapeutic approach. Furthermore, the validity of the randomised trial as a scientific tool depends on its use of scientifically valid terms of reference, and without a scientifically defined measure of effectiveness, such trials can produce only subjective results.¹⁶ This issue is particularly important because homeopathy has a definition of effectiveness, which is discussed below.

Finally, there is substantial scope for errors in the design of randomised clinical trials to test homeopathic treatment.¹⁷ Failure to take this into account can result in a trial actually testing two inert treatments against each other, and lead to false conclusions about the effectiveness of homeopathic treatment. This issue is discussed further in Appendix 2, but it is not mentioned at all in *Sense About Homeopathy*, even though it is essential for any scientific discussion of the effectiveness of homeopathic treatment and the validity of the system of homeopathy.

“Homeopathic principles”

Sense About Homeopathy claims that “homeopathy is based on two beliefs: (a) like cures like; and (b) the smaller the dose the more potent the cure”. This statement is untrue. Homeopathy is founded on the following principles:

1. That all symptoms other than those resulting directly from mechanical or toxic damage are part of the body’s curative processes;¹⁸
2. That life and states of health are biophysical phenomena rather than biochemical ones;¹⁹
3. That it is the totality of the symptoms, including their chronological relationships, which must be treated, not individual symptoms;²⁰
4. That a substance which produces in a healthy person symptoms most similar to the totality of the sick person’s symptoms will cure those symptoms (“like cures like”);²¹
5. That only a single medicine should be given at a time in order that there should be no confusion about the action of the treatment;²²
6. That the minimum dose capable of effecting curative change should be used, and this may mean the use of a dose with biophysical properties rather than biochemical properties.²³

7. That the biophysical properties of a substance may be developed by a process of dilution with succussion (potentisation).²⁴

Three of these principles should not be entirely unacceptable to orthodox drug therapy. Vaccination, desensitization treatment for allergies, and the use of drugs such as digitalis, ritalin and quinine are all examples which reflect the principle of “like cures like” (4), and further information is supplied in Appendix 3. The recognised problem of interactions between orthodox drugs justifies the proposal that only a single medicine should be used at a time (5).²⁵ Both therapeutic and cost concerns demand that the minimum necessary dose should be used, though orthodox pharmacology only accepts this in chemical terms (6). The use of potentisation in homeopathic practice is discussed more fully in the section on the minimum dose.

In failing to state the basic principles of homeopathy accurately, *Sense About Homeopathy* also fails to acknowledge that the process of formulating these principles took more than forty years and involved a systematic process of observation, reasoning and research, both experimental and academic.²⁶ This made homeopathy the first medical system to be developed through the scientific method,²⁷ and evidence of the power of homeopathy’s scientific approach is given in Appendix 4. In this context, the statement that homeopathy is “based on two beliefs” seriously misrepresents the facts. In addition, the minimal information actually provided is neither correct nor consistent (as we will show), and so it appears that there is no intention of providing a scientifically accurate account of homeopathy.

“Like cures like”

Even the explanation in *Sense About Homeopathy* of ‘like cures like’ is seriously inaccurate, since it ignores the importance to homeopathy of the ‘totality of symptoms’, and substitutes for this the abstract concept of ‘disease’. Thus it is not true that “homeopaths choose a substance that causes the same symptoms as the disease they want to treat”, because homeopaths do not treat diseases. They treat the individual totality of the patient’s symptoms. The scientific importance of this distinction can be understood if we consider the process of establishing a specific disease description. As Wulff and others put it,

Doctors have studied millions of sick people, and we must imagine that no two of these were ever completely identical as regards their clinical pictures and the underlying causal mechanisms, but in order to build up a medical science, it was essential to stress the similarities rather than the differences.²⁸

The process of defining diseases involves identifying a group of signs, symptoms and causal processes which *commonly occur together*, but which differ from other such groups. As our knowledge of signs and causal processes increases, so this process of differentiation leads to a steadily increasing number of named diseases,²⁹ with the result that pneumonia, for example, is currently subdivided into eleven different diseases.³⁰ In many cases one disease subdivision is “idiopathic”, which is to say that the cause is individual, and no common cause is known.³¹ Indeed, the logical and only scientifically valid conclusion of this process of differentiation of diseases is to define disease as the actual signs, symptoms and causes in the specific individual case.³² This is precisely the totality of individual and uncommon patterns of symptoms which homeopaths treat, and any other disease description may be convenient, but scientifically it can be only an arbitrary and temporary categorisation.

The significance of the mistake being made in *Sense About Homeopathy* can be seen by considering the examples given. In one example Tyler states that “the runny nose and watery eyes of a cold can be recreated by inhaling onion fumes, so onion juice can form the basis of a homeopathic preparation”. In another example it is claimed that (original emphasis) “the principle of like cures like holds that only the *symptoms* of the disease and treatment need match, no matter what condition or pathogen lies behind them”, and that “a headache could be a symptom of stress or a brain tumour, but the required treatments are very different”. In both these cases a generalised statement of illness is considered, and orthodox medicine might well prescribe generalised treatments, such as a drug to dry up the flow of mucus,³³ or a painkiller for the headache, such as Paracetamol, if no further investigation were made.

For a homeopath, an investigation of the totality of the symptoms is essential if the right substance is to be identified, using a ‘repertory’ in which substances are listed under the headings of different symptoms. Since the ducts draining tears from the eyes lead into the nose, it is hardly surprising to find that there are some 240 substances known to homeopaths which might potentially be appropriate to the condition of a runny nose and watery eyes.³⁴ However, investigation merely of whether the discharges are bland or excoriating immediately reduces this number, so that onion (*Allium cepa*) is one of only 8 substances where the discharge from the eye is bland, but that from the nose is excoriating, and it is not one of the two substances in which this relationship is reversed, and the discharge from the eye is excoriating, but that from the nose is bland.³⁵

The example of the headache is an even more extreme misrepresentation of the truth. One repertory has 196 *pages* covering head pain and relevant substances, taking into account the type of pain, the location and any directional component of the pain, the time of day and frequency of appearance of the pain, and various factors which may alter the pain.³⁶ When this level of detail is combined with equally detailed investigation of *all* the other symptoms experienced by the patient seen in the context of their sequential relationship in the medical history, it is obvious that a properly trained homeopath is highly unlikely to be confused about whether a headache is “a symptom of stress or a brain tumour”. The totality of the symptoms will be indicative of the totality of the derangement of health in that individual. In other words, the failure of this leaflet to make clear the relationship of ‘like cures like’ to the ‘totality of symptoms’ indicates the complete failure of its author to understand or explain the principles of homeopathy. As a result, *Sense About Homeopathy* is utterly incapable of informing the public about homeopathy.

The statement in this section of *Sense About Homeopathy* that homeopathy treats “only the symptoms ... no matter what condition or pathogen lies behind them” is also thoroughly confusing. In orthodox medicine a ‘condition’ is defined by a set of symptoms (subjective changes observable by the patient alone), signs (objective changes observable by others) and causes commonly appearing together. By separating out symptoms and causes (i.e. a “pathogen”) Tyler appears to be using the term ‘condition’ to mean ‘signs’ and suggesting that treatment needs to be based on signs and causes rather than symptoms. If this is the case, then Tyler is overlooking some basic medical facts, since there is no guaranteed correlation between signs and symptoms. Individuals can have signs without symptoms or symptoms without signs, and both sets of information are necessary in determining the dysfunction which needs treating.³⁷ Since no pathology can arise from healthy function*, making changes in function and signs and symptoms of dysfunction crucial to the process of determining treatment.

Similarly pathogens can be present in an individual without any appearance of illness, and an individual can be ill without pathogens being present. Furthermore, pathogens exist in the environment all the time without making everybody ill all the time, since people only get ill if they are susceptible to a particular pathogen. So even when a pathogen may be involved in an illness, it is not the pathogen which causes the illness, but the combination of an individual’s susceptibility

* This excludes, of course, the physical destruction of tissue from causes external to the body’s function.

and a pathogen which can exploit it. This susceptibility is a function of the individual body's ability to maintain and restore health, and so even illnesses apparently resulting from a pathogen are fundamentally due to a disturbance of the individual's ability to maintain and restore health. As a result truly effective treatment *must* treat the individual, rather than the pathogen, since acting against the pathogen does not alter the individual's susceptibility to it, whilst a healthy body is clearly quite capable of dealing with pathogens on its own. In other words, the process of illness ultimately depends on the function of the individual (indicated by signs and symptoms) not on causes, and so an insistence on the primacy of signs and causes would be scientifically unjustifiable.

Sense About Homeopathy also claims that the homeopathic principle of 'like cures like' "is not a theory that fits with how the body works and is problematic". We have shown that treatment based on the totality of symptoms, signs and indications of causative factors is scientifically sound but there is still the specific issue of whether the relationship of similarity is also scientifically sound. Further information about this issue in orthodox medicine is given in Appendix 3. On this aspect the leaflet alleges that "some homeopaths say that it works like a vaccine". Hahnemann (who established the principles of homeopathy) discussed vaccination over 170 years ago as part of his study of the effect of diseases on each other, including the curative effect of exposure to a disease similar to one already being experienced.³⁸ As such, vaccination does not *explain* the principle of 'like cures like', but it did form part of the research which led to the proposal of the general rule.

As regards modern knowledge of anatomy and physiology, it has long been known that a substance which depresses cellular function in a relatively large dose, can stimulate it in a very small dose, a principle known as hormesis or the Arndt-Schulz law. Clearly the concept of harmful substances being beneficial is not problematic to pharmacologists. In addition, the fact that the human body is a homeostatic organism means that it has a dynamic rather than passive response to stimuli which threaten to take function out of its current 'normal' range. In cases where the 'normal' state involves signs and symptoms of disease, the reaction to drugs intended to reduce these signs and symptoms can be a 'rebound effect', where the original signs and symptoms return in an exaggerated form when the drug stops being taken.³⁹ On this basis it is entirely reasonable to suppose that a treatment which attempts to stimulate the same signs and symptoms as are already being experienced will also see an opposing reaction, but in this case the reaction would be opposed to the very signs and symptoms being treated. In other words, the principle of 'like cures like' is not in theory problematic to biologists, and a scientific approach to homeopathy should make this clear.

What is problematic is the issue of how this approach can be used without risk of poisoning the patient.

“Minimum dose”

The appropriate response to concerns about the toxicity of a treatment is to look for the smallest dose capable of curing the signs and symptoms, as both orthodox pharmacologists and homeopaths know. In the case of homeopathy, *Sense About Homeopathy* claims that its approach to this problem is based on a belief that “the smaller the dose the more potent the cure”, and yet the leaflet goes on to point out that

the chosen substance is repeatedly diluted and shaken (also called succussed). This is supposed to reduce the substance’s potential to harm, and also make it more effective.

Succussion is closer to ‘banging’, as in “given one hundred strong succussions with the hand against a hard but elastic body”,⁴⁰ and the combined process of dilution and succussion is known as potentisation. This is important because *Sense About Homeopathy* discusses the minimum dose in homeopathy solely in terms of dilution.

Clearly “reducing the dose” (dilution) is not the same as potentisation, since the latter process involves dilution *and* succussion. According to *Sense About Homeopathy*, to prove something is to “describe a statement that is, by logic, necessarily true”, so if we consider the issue mathematically, then

Let p = potentisation, d = dilution, and s = succussion

Then $p = d + s$

Therefore, it is “necessarily true” that no matter what the value of d ,

$p = d$ only if $s = 0$

In other words, to claim that potentisation is the same as dilution, it is necessary to prove that succussion has no effect. Tyler makes no attempt to do this, and in fact there is substantial and growing evidence from replicated and multi-centre studies which indicates that potentised substances can act very differently from the same substances diluted (see Appendix 1). These studies include research on tissue samples, plants and developing frogs, none of which are capable of the placebo effect. In short, there is a real possibility that succussion has a real effect, and it is unscientific to assume that potentisation is the same as dilution.

This means that the extended discussion of dilution in *Sense About Homeopathy* is irrelevant, misleading, and clearly based on an assumption that no substance can affect its environment other than by chemical action. This is summed up in the statement that “homeopathic preparations have been diluted to such an extent that many do not contain a single molecule of the active ingredient”, incidentally a clear indication that this process does “reduce the substance’s potential to harm”. Hahnemann, the discoverer of homeopathy and a respected chemist,⁴¹ pointed out over 180 years ago that highly potentised substances cannot have medical effects through chemical action, and that any discussion of their chemical properties is futile.⁴² The failure of this leaflet to address the need to discuss biophysics rather than biochemistry is not only unscientific, but leads to a further error.

By excluding succussion and treating potentisation solely as chemical dilution, *Sense About Homeopathy* confuses this process with that of dilution in the wider environment. Thus it claims that

Homeopaths believe that water can ‘remember’ the active ingredient. If water had this ability, it would also remember the other substances that have been diluted into it over time.

This ignores not only the significance of potentisation as a specific process, but also the relevance to this process of the principles of enhancing signal to noise relationships. Potentisation starts with a solution in which the quantity of the desired substance is high and that of any contaminants very low, and then succusses this solution. Subsequently part of this solution is added to a liquid in which the quantity of contaminants is again very low and not identical to those in the first solution, and the new solution is succussed. If succussion were capable of amplifying the ‘signal’ of the desired substance, then each step would make that signal clearer against an increasingly randomised ‘noise’ from contaminants. In other words, this process would continually develop a separation between the ‘signal’ level and the ‘noise’ level, despite the reduction in material quantities of the selected substance.

In *principle*, therefore, potentisation is scientifically valid. In *practice*, as we have pointed out above (and in Appendix 1), there is good quality evidence from laboratory experiments which suggests that some form of ‘signal’ is retained in potentised substances even though the material quantity reduces to zero. Furthermore, the process of potentisation, with its separation of the ‘signal’ of a specific substance from the ‘noise’ of other substances, does not occur in the wider environment, and without this process ‘succussion’ will simply produce random ‘noise’. The fact that homeopathy developed this process decades before electrical engineering created the

terminology to describe it provides additional circumstantial evidence of the scientific basis of homeopathy. What remains is the question of whether potentised substances, used according to the principles of homeopathy, are actually effective in practice.

“The evidence”

Sense About Homeopathy states that “over 150 clinical trials have failed to show that homeopathy works”, though “some small-scale studies have yielded positive results”, adding that these are “due to poor methodologies or random effects”. No information is provided about these trials, nor even any references for them, so this evidence is impossible to check. On the other hand, in 2000 an analysis of 89 trials⁴³ revealed that there were trials of a high standard which also “yielded positive results”, or, to quote the journalist Ben Goldacre (writing against homeopathy!), “there are some good-quality trials bucking the trend and showing that homeopathy is better than placebo”.⁴⁴ In the case of these trials, the positive effects could not be “due to poor methodologies or random effects”, and careful analysis of the meta-analysis by Shang and others (discussed below), also revealed that the “quality of homeopathy trials is better than of conventional trials, for all trials ($p = 0.03$) as well as for smaller trials with $n < 100$ ($p = 0.003$).”⁴⁵ Clearly Tyler’s overview of the state of evidence about trials of homeopathic treatment is seriously defective.

In addition, Tyler does not discuss the issue of “poor methodologies” in respect of meeting proper homeopathic criteria in clinical trials. As we have pointed out (in Box 3: “Clinical trials” and Appendix 2), this issue can lead to a clinical trial testing one placebo against another, even though the trial may be superficially rigorous by pharmacological standards. The result of this failure is that the public is given the misleading impression that RCTs are reliable and that they have produced conclusive evidence that homeopathic treatment “is no better than placebo”, when this is simply not true.

Sense About Homeopathy also specifically refers to a meta-analysis of 110 trials by Shang and others,⁴⁶ published in *The Lancet* in 2005, and it claims that this analysis found “no evidence that homeopathic preparations work”, adding that “Over a dozen similar analyses have arrived at the same conclusion: that homeopathy does not perform any better than placebos.” These statements are quite simply untrue. To begin with, the actual conclusion of the researchers was that “there was weak evidence for a specific effect of homoeopathic remedies”, though they also stated that “This finding is compatible with the notion that the clinical effects of homoeopathy are placebo effects”. Secondly, the conclusions were based on only 8 unspecified trials out of the 110 trials of

homeopathic treatment. Thirdly, the other four similar analyses of RCTs of homeopathic treatment^{47,48,49,50} had “reached the qualified conclusion that homeopathy differs from placebo”.⁵¹

Furthermore, serious questions were raised by the end of 2005 about the nature of this meta-analysis by Shang and others. For example, Klaus Linde and Wayne Jonas pointed out that

Shang and colleagues do not follow accepted and published guidelines for reporting meta-analyses. In 1999, The Lancet published the QUORUM statement for improving the quality of reports of meta-analyses³ and the Cochrane Collaboration guidelines are listed in the instructions for authors. Shang and colleagues did not follow either of these guidelines, nor did The Lancet intervene. The QUORUM statement clearly requires that meta-analyses present “descriptive data for each trial” and “data needed to calculate effect sizes and confidence intervals”. Shang and colleagues do not report the trials excluded from the review, the quality assessments and odds ratios of all trials included in the review, nor which eight trials were included in the final meta-analysis. This lack of detail is unacceptable in a paper drawing a strong clinical conclusion.⁵²

The issue of how the final eight trials of homeopathic treatment were selected was also raised by Peter Fisher and others, who pointed out that

The conclusion that “the clinical effects of homeopathy are placebo effects” is based on only eight, anonymous, clinical trials. These studies are not referenced and no information about them is given. The quality criteria are standard measures of internal validity, but before reaching their conclusion, Shang and colleagues added a further criterion—study size. We wonder how sensitive their analysis would be to changes in the cut-off points for this criterion. For instance, what would the result be if the 21 “higher quality” homeopathy trials were used? The opacity of this paper means that it fails a key test of a good scientific report: that a reader should, in principle, be able to reproduce it.

The problem, as R. Lütke and A.L.B. Rutten put it, is that “Meta-analysis is a subjective procedure, Boden warns that it can easily become a weapon instead of a tool”,⁵³ and there is a tendency among those hostile to homeopathy (such as Edzard Ernst and Simon Singh) to ignore this fact, and to suggest that meta-analyses are actually more reliable than the trials they are based on.⁵⁴ In fact, as meta-analyses are based on clinical trials, they will necessarily reflect any fundamental deficiencies in the trial parameters, and because they are gathering information from a range of trials, there can be difficulties over the compatibility of the data. Thus Linde and Jonas also criticised Shang and others because

problems with pooling are not discussed. Pooling of data from clinical trials makes sense only if all the trials measure the same effect. In our 1997 meta-analysis, we justified the pooling of different interventions, conditions, and outcomes on the basis that, if homeopathy is always a placebo, all trials measure, in principle, the same thing. There are major limitations associated with this assumption.⁵⁵

Tyler’s choice not to discuss the evidence from laboratory trials of potentised substances (see Appendix 1) or the evidence from outcome studies (see Appendix 2), but to rely on this meta-analysis as the only referenced source for the claim that homeopathic treatment is no better than

placebo was already an unacceptable position scientifically by the end of 2005. By the end of 2008 detailed analysis of this meta-analysis, based on information which was finally made available, had confirmed that the criticisms were justified, and revealed (among other things) that *subjective* elements were crucial factors in Shang and others reaching the stated conclusions:

Sensitivity analysis showed that one indication and the chosen cut-off value for larger trials explained the final conclusion of statistically non-significant effect.

The criterion of trial size also appeared to have been selected *after* analysis rather than before:

Cut-off values for larger trials were unexplainably different for homeopathy (n = 98) and conventional medicine (n = 146). This suggests post-hoc hypothesizing.

Selection on the basis of trial quality firmly supported the claim that homeopathic treatment is better than placebo:

If only higher quality trials are considered, the placebo hypothesis for homeopathy is falsified, OR = 0.76 (95% CI 0.59–0.99).⁵⁶

Nonetheless, the leaflet has not been altered to take this information into account.

Sense About Homeopathy not only relies on a single type of evidence, but it misrepresents this evidence, thus ignoring the scientific requirements for rigour and objectivity, and ignoring the specific requirements of evidence-based medicine. Significantly it also ignores the need to explain the serious discrepancies between the results of different clinical trials and between the negative results of some of those trials and other forms of research. One possible explanation for this is that *Sense About Homeopathy* is a deliberate attempt to mislead the public. Another possible explanation is that Tyler does not understand the capabilities and limitations of clinical trials and meta-analyses, in which case *Sense About Homeopathy* cannot provide the public with reliable information.

Effectiveness

RCTs are a scientific tool, and as such depend for their validity on the scientific definition of their terms. Central to their validity is the need for a definition of effectiveness, but, for all its references to what ‘works’ and what ‘does not work’, *Sense About Homeopathy* fails to define what is meant by effectiveness. When RCTs are used to establish evidence of harm, the baseline is easily defined as the current state of health, and harm is easily defined as an increase in morbidity and mortality. In this circumstance the individuality of the patient is relevant only in that it alters how

quickly and how severely a person is affected, and so it is possible to establish scientifically clear outcomes from RCTs when testing for harm. The same is true in those instances when a test of benefit is actually a test of ending harm. For example, scurvy is the result of deprivation of vitamin C, and so tests showing that the restoration of vitamin C to the diet cures scurvy are simply confirming that deprivation of vitamin C is harmful.

As we have outlined above, susceptibility to illness, recovery and the maintenance of health are processes determined by the individual's response to the environment, so any scientific definition of effectiveness in providing *benefit* must acknowledge and incorporate that individuality. However, the purpose of RCTs is to minimise the value of individual responses because, as *Sense About Homeopathy* puts it, "individual peculiarities will skew the results". In line with this, RCTs usually rely on at least two arbitrary and generalised definitions. Firstly, researchers decide what specific signs and symptoms it is their 'intention to treat' in a group of subjects regarded as having a particular 'disease', regardless of the full variation in actual signs and symptoms across the group. Secondly, effectiveness is determined by the treatment's success in reducing those particular signs and symptoms, whilst any other significant effects of treatment are categorised as 'side effects'. As a result, the alleged effectiveness of a treatment can vary simply as a result of changing the 'intention to treat', although the full range of its effects will not change.

In the case of homeopathy, the effects of a potential medicine are established before the substance is used to treat anyone, and the choice of medicine is determined individually according to general rules (as explained above). In addition, what *Sense About Homeopathy* does not mention is the fact that homeopathy has developed a definition of effectiveness, known as Hering's 'Law of Cure', based on decades of observation, and confirmed by nearly two centuries of further observation, in other words, based on the application of the scientific method. Ironically, Hering himself was originally commissioned to investigate and expose homeopathy. He took the task of investigation seriously, unlike Tyler, and came to the conclusion that it is a genuinely effective system of medicine, subsequently becoming one of the great homeopaths. The law he proposed in 1828⁵⁷ provides a general framework which enables homeopaths not only to determine whether an individual patient is recovering or not, but also to identify from the individual's case history what can be treated at a particular time. As a result, it provides a definition capable of being tested scientifically, and capable of enabling the scientific use of RCTs. This is discussed more fully in Appendix 2).

In ignoring the need to define effectiveness, *Sense About Homeopathy* also ignores serious issues which affect the validity of randomised controlled trials, whether of homeopathic or of orthodox medical treatment. It also ignores the fact that the results of different RCTs (especially those of homeopathic treatment) can contradict each other, and can often be at odds with other evidence. As a result it overlooks one point of great significance arising from these issues, which is the obvious fact that *RCTs are not an infallible test of the placebo effect*. If they were infallible, and if homeopathic treatment is a placebo, then the best trials would infallibly reveal this. Since this is not the case, then either RCTs are fallible (a generally accepted fact), or homeopathy is not a placebo (a disputed point) or RCTs are fallible *and* homeopathy is not a placebo.

At the same time, *Sense About Homeopathy* also fails to acknowledge an important part of the development of the theory and practice of homeopathy: the Law of Cure. As a result it not only fails to provide “help or information on a difficult or controversial area of science” (p. 2), but actually misleads the public into an uncritical belief in the reliability of RCTs to prove that a treatment provides benefit or that it is a placebo.

*Discussion of Page 2**

The second page of *Sense About Homeopathy* is almost entirely about the placebo effect and its supposed relationship to homeopathy. Thus far, however, the leaflet has not addressed any of the three crucial points mentioned earlier, namely that:

1. *Homeopathic treatment must be shown to be inert;*
2. *Homeopathic treatment must be shown to produce only expected effects;*
3. *The effects of homeopathic treatment must not differ significantly from those of a placebo.*

At the same time we have pointed out above, and in Appendix 1, that there is evidence that homeopathic treatment is not inert, that its effects are not dependent on expectation, and that its effects differ from those of placebos. We have also shown above, and in Appendix 2, that there are serious problems with a reliance on RCT evidence for proof that a treatment is effective or that homeopathic treatment is a placebo. Finally, we have also shown above, and in Appendices 2 and 4, that there is theoretical justification for the approach used by homeopathy, evidence from orthodox medicine for its principle of ‘like cures like’, and historical evidence that homeopathy has been able to draw conclusions based on its approach which have later been found to be correct.

The claims in *Sense About Homeopathy* that homeopathic treatment is a placebo are unsubstantiated and appear scientifically unsound. Nonetheless, Tyler devotes approximately half of this publication to discussing the placebo effect, implying that this discussion is equally applicable to homeopathy. This approach is inexplicable by any reasonable standards of scientific rigour and objectivity, and so it is reasonable to look for an explanation. The first page of *Sense About Homeopathy* has indicated that Tyler may not actually be competent to discuss medicine or homeopathy, let alone to discuss them impartially, and the second page will be found to offer further support for this explanation. This raises the question, of course, as to why *Sense About Science* has employed someone to write an information leaflet about homeopathy who appears to be incompetent to do so, especially as it claims to “to promote evidence and scientific reasoning in public discussion”.⁵⁸ This issue will be discussed in the conclusion.

* All unacknowledged quotations in this section are from page 2.

“Why homeopathy ‘works’”

This page opens with the statement that “People use homeopathy because they believe it works”. No evidence at all is offered to support this assertion, despite the fact that there is evidence that people frequently turn to homeopathy out of desperation rather than belief. One high-profile example is Roger Daltry, who said that

I had a very, very dramatic experience with my son when he was nine months old. He had gastro difficulties, started throwing up, could not keep any food down and turned into skin and bone. At the hospital, they did every test to him, and in the end they just handed him back to me. My wife and I were in bits. My poor baby. The kid was dying. It was terrifying. I thought, there's got to be something. I'd heard of homoeopathy, so I found a local guy in the Yellow Pages and took my boy there. He gave him some powders. Within two weeks he was putting weight on, keeping the food down. The trouble recurred periodically for a couple of years, but he's now 27, a fit and healthy young man.⁵⁹

Given statements such as this, there is a need to provide convincing evidence that belief is a primary reason for people using homeopathy. Furthermore, whatever belief Daltry may have had, if claims that homeopathic treatment works by the placebo effect are to be scientifically valid, it is necessary to explain how a nine-month old baby could exhibit the expectation necessary to produce the placebo effect, and how the effect could last 27 years.

Without this necessary evidence, the author not only goes on to repeat the assertion that homeopathic treatment works by the placebo effect, but that “Although homeopathy, like other placebos, does not work in a clinical sense, it can induce physiological changes”. The definition of the placebo effect on the first page states that physiological changes “emerge” from a placebo which is “inert” and “does nothing”, but Tyler is taking the first step in a process of distortion of this definition. On the face of it *Sense About Homeopathy* is acknowledging that homeopathic treatment is not inert and can actively “induce” physiological changes, but it is simultaneously asserting that homeopathic treatment is “like other placebos”, implying that placebos can “induce” changes. Furthermore, in an attempt to devalue both the acknowledged real effects of homeopathic treatment and of the placebo effect, a distinction is created between ‘inducing physiological changes’ and ‘working in a clinical sense’. No explanation is offered as to what this distinction really is, even though, in discussing clinical trials, Tyler has already made it clear that the placebo effect is indistinguishable from the effect of a treatment. The result of this purely semantic distinction is that those reading the leaflet are encouraged to invent an explanation unconsciously which has no scientific foundation, but which seems correct because it arises from the reader’s own preconceptions. This is not just unscientific, it is seriously duplicitous and misleading.

The paragraph ends with a further claim that homeopathic treatment "... can also coincide with getting better anyway", an issue which will be discussed when it reappears in a later section. In the end this page opens with a curious set of statements, in which Tyler appears to claim that a patient having homeopathic treatment does not really get better; that they do get better; and that they were probably getting better anyway. This is hardly an objective and authoritative scientific position, and it certainly cannot be regarded as promoting "good science for the public".

"The placebo effect"

Before discussing the issues around the placebo effect in this section of *Sense About Homeopathy*, it is worth commenting on the claim that the placebo effect's "best application is dealing with symptoms of disease, not with the disease itself". This echoes what was said about homeopathy on the first page, where disease was equated with "conditons" and "pathogens", but at this point a sign (swelling) is included in the illustrative list of "symptoms of disease". It may be that the author is unaware of the difference between signs and symptoms, which would be unacceptable ignorance in someone writing 'scientifically' about a system of medicine. It may be that the author uses the expression "symptoms of disease" with a meaning different from that of the particular words used, in which case it is unacceptable that this expression is not defined. Whichever is the case, in a leaflet intended to "promote evidence and good science" there is a need to explain what is meant by the distinction between "disease" and "symptoms of disease".

Tyler then argues that "The belief that one is receiving a treatment" reduces stress, and that "reduction in psychological stress can accelerate recovery from wounds and viruses (by boosting immune function)". This is an interesting position, because a little later it is claimed that placebo "is not effective for curing broken bones, infectious diseases or cancers". No explanation is given as to why the immune system distinguishes in this way between viral and other infectious diseases, or why soft tissue repair is accelerated but not bone repair. Furthermore, according to the cited research,⁶⁰ the immune system is not boosted or stimulated by a reduction in stress, but is simply less inhibited as a result. The failure to appreciate that reducing an inhibitory process is very different from actively stimulating a process, indicates that Tyler has a worrying lack of understanding of medicine and physiology.

At the same time, this passage serves to direct the readers' invented distinction between 'inducing physiological changes' and 'working in a clinical sense'. Tyler is associating placebos with psychological effects, with the implication that all other real effects are simply a product of a

reduction in stress. This may be the case, but Tyler does not provide any evidence to support this suggestion, nor any explanation of how this process take place, and, since there is no scientific explanation of the placebo effect, such evidence and explanation would be difficult to provide. In effect, Tyler is covertly redefining the placebo effect on the basis of an unsupported hypothesis.

Sense About Homeopathy then states that “Conditioned responses also play a part” in the placebo effect, explaining that people “who use morphine regularly, may replace a morphine dose with a placebo and it will often work”. It then confirms the point made in the discussion of the first page, noting that “the more frequently the placebo is administered, the less effective it becomes: the body learns to recognise the difference between the real treatment and the fake”. However, having established that a real, specific and regularly repeated stimulus can provoke an unreliable short-term placebo response, Tyler claims that

Past experiences of medical treatment may stimulate the immune system to act faster when a subsequent treatment (even a placebo) is received.

For several reasons, such a statement is quite simply absurd.

Firstly, we have pointed out that Tyler has provided no evidence that a placebo can “stimulate the immune system to act faster”, and no evidence is provided to support the idea that orthodox medication does this either. Secondly, the very specific treatment context (current regular morphine doses) has been replaced by a wholly non-specific one (“Past experiences of medical treatment”). Thirdly, a nebulous “subsequent treatment (even a placebo)” has been substituted for a specific placebo (one mimicking the regular dose of morphine). In short, Tyler has extrapolated the evidence to an utterly unjustified and unscientific extent, and claimed an effectiveness for placebos which is unsupported by any research. At the same time, the statement that “Placebo effects only work on minor ailments”, reflects a position in direct contradiction to the picture just presented.

“A powerful placebo?”

The confusion about the significance of the placebo effect is continued with the assertion that “Reports that homeopathy has cured quite serious conditions are sometimes attributed to a ‘powerful placebo effect’”. Despite having said that “Placebo effects only work on minor ailments”, Tyler does not reject the possibility of a “powerful placebo effect”, but merely suggests that (our emphasis) “there are a number of other possible explanations that should always be discounted *first*”. Indeed, the research cited by Tyler claims that “most likely there was no placebo effect

whatsoever⁶¹ in the trials used to support the proposal of a “powerful placebo effect”. This raises the perplexing question as to how a powerful effect can be confused with no effect. The question of what might lead a placebo effect to be “powerful” will be discussed below, but it is interesting to note that if this and the “other possible explanations” are both invalid, then we are still left with the reality of reports (such as Roger Daltry’s) that “homeopathy has cured quite serious conditions”.

The two “other possible explanations” presented in *Sense About Homeopathy* (out of 13 suggested by Keinle and Keine) actually turn out to be different forms of a single explanation, namely that “administration of a pill will coincide with recovery, but not be related to it”. The first of these is “spontaneous recovery”, a term usually used to refer to unexpected and unexplained recovery from chronic conditions.* Tyler, however, excludes chronic illnesses, leaving only acute illnesses, which are short term and conclude in either recovery or death, and then excludes fatal illnesses. Apart from the fact that this is a serious distortion of the meaning of the term, it is difficult to understand how such an illness could be described as “quite serious”, since an acute illness is only serious if there is a very real expectation that it may prove fatal. If Tyler is referring to acute illnesses in which the professional expectation is that the patient will die, then it is not acceptable to simply discount the action of homeopathic treatment, especially as there is evidence that homeopathy is capable of being successful in such circumstances.

In the London cholera epidemic of 1854-5, the average mortality rate of those unequivocally diagnosed as having cholera was 61.9% across all the non-homeopathic hospitals in London,⁶² and this figure is in line with the mortality rate from cholera without treatment of 50-60%.^{63,64} This mortality rate without treatment is a general one derived from years of experience, and includes recovery from all causes, including spontaneous recovery. In this context a mortality rate of 33.3% of those unequivocally diagnosed as having cholera, which was achieved at the London Homoeopathic Hospital in that epidemic, can only indicate successful treatment of patients with a life-threatening acute illness.⁶⁵ It is, therefore, not sufficient to assert that recovery during homeopathic treatment may be a result of “the body’s own recuperative processes” alone, especially as there has been no proof offered that homeopathic treatment is inert. Furthermore, Tyler does not point out that orthodox medicine is unable to distinguish recovery as a result of treatment from recovery without treatment in any individual case, but relies on clinical outcome studies (such as the one above) to produce statistical evidence of the success of treatments in the real world. The

* It appears that the term ‘spontaneous recovery’ is being replaced by the terms ‘spontaneous healing’, ‘spontaneous remission’ or ‘spontaneous regression’, all of which emphasize the chronic nature of the illness.

failure to even mention the importance of this form of evidence indicates that the author is pursuing a seriously unscientific approach.

The second circumstance of coincidental recovery presented in *Sense About Homeopathy* is that of “fluctuating symptoms”. Tyler states that

For example, the pain associated with arthritis comes and goes. When the pain is bad, it will soon improve of its own accord, with or without treatment.

This argument depends on the supposition that reports of cures refer only to temporary alleviations of flare-ups of symptoms, but Tyler provides no evidence to support this supposition, nor any evidence that patients are unaware that their chronic symptoms may fluctuate, or that they are unaware of the difference between relief from a flare-up and cure. In other words this is simply conjecture without any evidential basis, and so completely unscientific.

Tyler goes on to explain how this conjectured circumstance might come about, claiming that “As people tend to seek treatment when symptoms are at their worst, it will appear that whatever medicines they took made them better”. Given that there may be several days (or even weeks) between a first-time patient seeking treatment and actually taking a homeopathic remedy, there is a need for systematic evidence that there is a consistent relationship between flare-ups, homeopathic treatment and recovery in order to justify such a claim. There is also a need to explain why homeopaths have a specific term for flare-ups (‘acute exacerbation of the chronic condition’) if they are unaware of the difference between fluctuating symptoms and the underlying chronic condition. In fact, a very basic knowledge of homeopathy reveals that these two states are treated differently by homeopaths. Quite simply, this claim is not a scientific explanation, but merely another unfounded conjecture. Furthermore, Tyler fails to discuss other important measures of benefit, such as changes in the rate of appearance of flare-ups, or changes in their severity, both of which would be more important indicators for patients and practitioners alike.

In the end, the best complexion these “other possible explanations” can be given is that they are speculative. At worst they confuse the issues and conceal important points which should be discussed. In neither case could they be described as an attempt “to promote evidence and good science for the public”.

Box 4: “Some interesting placebo facts ...”

Before leaving the question of the cure of “quite serious conditions”, it is worth looking at what justification *Sense About Homeopathy* offers for claims that homeopathy might be a “powerful placebo”. The leaflet provides four examples of factors which can produce a “stronger placebo effect”: the colour of the placebo; the quantity of the placebo; the physical form of the placebo; and the status of the prescriber. However, none of these apply to homeopathic treatment, since homeopathic medicines are uncoloured; they are presented in pillules, tablets or liquid form only, not capsules; they are usually given singly; and they are prescribed by practitioners so low on the scale of health professionals (according to Tyler) that their therapy “has not been embraced by medical science” (p. 1). For homeopathy to have a “powerful placebo effect” whilst failing to use even the most basic techniques of boosting this effect would in itself be a remarkable achievement.

“Veterinary homeopathy”

Sense About Homeopathy acknowledges that successful homeopathic treatment of animals “cannot be explained by the placebo effect”, but then maintains that any alleged success is not real, but is simply a product of “observational biases” resulting from a failure to use “standardised observational measures or independent veterinary surgeons” in trials. However, no explanation is given of what this means in practice, nor are any examples given of trials which meet or do not meet these criteria. These are not minor issues either, since veterinary intervention is entirely based on observable signs of ill-health (rather than symptoms), and signs which are of sufficient significance as to warrant action (and expense on the part of the animals’ owner). It is, therefore, important that evidence should be supplied which proves that veterinary surgeons (and owners) can confuse the real presence or absence of such signs with a merely imaginary presence or absence, and which explains why this might occur. Without such evidence this claim is again merely an unsupported assertion with no scientific justification.

“Prescribing placebos”

The final section of *Sense About Homeopathy* deals with issues relating to the prescribing of placebos, and presents three arguments against their use. The first of these is of particular interest, since it relies on the claim that

... the ethics of modern medical care demand that the relationship between the patient and the clinician should be based on honesty, respect, openness and trust.

Tyler then goes on to say that

Prescribing placebos would require the doctor to lie to the patient (because otherwise the placebo would not work) ...”.

In the abstract, if stating that a placebo will work means that it will work because “the patient believes it will work” (p. 1), then the statement is not a lie, since what was claimed would happen actually does happen. The problem is that this is not an abstract issue, but a practical one, and one relating to any prescription. Treatment decisions depend on the specific circumstances, and in some circumstances it may be appropriate to prescribe a placebo and it may be likely to have the desired effect. It is an over-simplification to present the issue as an entirely abstract problem.

What makes this argument completely hypocritical, though, is the fact that Tyler starts this section by stating that “Homeopathy works as a placebo”, and that “placebos make people ‘feel’ better”. Not only has this leaflet completely failed to provide any evidence that homeopathic treatment is a placebo, but we have shown that it is a claim which is probably impossible to justify scientifically. At the same time, the assertion that “placebos make people ‘feel’ better” is also wholly unjustified by statements made elsewhere in this leaflet.

When the placebo effect is first defined by Tyler, it is “an effect, biological, biochemical or physiological, that emerges from an inert treatment” (p. 1). We have pointed out that this is subsequently modified when Tyler claims that “homeopathy, like other placebos, ... can induce physiological changes”, since this implies that the “inert treatment” must now be regarded as active. At the same time Tyler encourages readers to accept the idea that the placebo effect is simply a reduction in stress, and that the other real effects are merely a consequence of this. By stating that “placebos make people ‘feel’ better”, Tyler confirms this process of re-defining the placebo effect, presenting the placebo as an active treatment which produces only an emotional response. In other words, the relationship stated in the original definition has been completely reversed, and on the basis of this new and unjustified definition Tyler chooses to lecture the public on “honesty, respect, openness and trust” and on whether doctors should lie. Quite simply this is scientifically dishonest.

This dishonest approach appears again in the second argument against the prescribing of placebos, when Tyler again tries to suggest that the placebo effect and the effects of a treatment are different, even though they cannot be distinguished from each other. *Sense About Homeopathy* states that placebos “tackle the symptoms of the disease, rather than the disease itself”. As we have shown, Tyler has re-defined the placebo effect as primarily a ‘subjective’ psychological or

emotional response, whilst symptoms are a ‘subjective’ aspect of illness only observed by the patient themselves. In this context, the treatment of fatigue is offered as an example of a subjective state being altered by a placebo which only has subjective effects, whereas fatigue “could be a symptom of depression, a viral infection or worse”. No evidence is provided to suggest that placebos are used in the treatment of fatigue, and the idea that any medical practitioner would treat a depressed patient for fatigue rather than some form of depression seems extraordinary, since the possibility that “general activity may slow down”⁶⁶ is not the dominant characteristic in such patients. To imply that a homeopath might do this is nonsensical, since any homeopath looking up “fatigue” as a symptom in the main repertories will either not find it,⁶⁷ or will be directed to physical weariness with hundreds of remedies to choose from and no means of distinguishing the appropriate remedy without more information.⁶⁸ As such, this can in no way be called a “shortcut”.

We have pointed out earlier that to ignore the importance of the totality of symptoms is to ignore a fundamental principle of homeopathy, and this example serves to show that ignoring the totality of symptoms is also bad medical practice in general, since the combination of all the signs and symptoms can reveal the processes associated with an individual’s illness. The orthodox medical condition of “depression”, for example, is subdivided into a range of different conditions with different characteristics and aetiologies, requiring investigation of more than a single sign or symptom to be clear about what is being treated. Within the orthodox medical tradition too these different conditions are treated in different ways. In other words this argument reveals nothing about placebos or homeopathic treatment, but it does indicate again that Tyler is profoundly ignorant of medicine in general and homeopathy in particular.

The example of fatigue also fails to explain what is meant by the contrast between “the symptoms of the disease” and “the disease itself”, though it parallels the earlier contrast between the “symptoms of disease” and a “condition or pathogen” (p. 1). Depression, for example, is a condition in which the most important indicators are symptoms rather than signs. Thus Tyler’s earlier use of the term “condition” in contrast to the “symptoms of disease” appears not to have been intended to distinguish objective signs from subjective symptoms, but *categories* of symptoms from *actual* symptoms, with the clear view that it is more important to treat the categorisation than the actuality. As we have pointed out, the categorisation of diseases and conditions is conceptual, whereas the actual symptoms are real, so Tyler is posing the philosophical argument that the

concept is more important than the reality, which is wholly unscientific, and suggests support for a pre-scientific rationalism.

What makes this particularly bizarre is that *Sense About Homeopathy* is also arguing that the only certain knowledge about medical treatments is evidence from randomised controlled trials, a debased version of evidence-based medicine, and we have shown that evidence-based medicine itself is a form of empiricism, the pre-scientific opposing view to rationalism. In other words, Tyler is not employing a consistent *scientific* approach, but choosing between two *pre-scientific* and contradictory approaches to suit the the needs of the argument at different points. In the end, Tyler appears in *Sense About Homeopathy* to be ignorant in the field of homeopathy, incompetent in the field of medicine, duplicitous in the field of philosophical reasoning, and scientifically dishonest throughout.

Conclusion

We have discussed *Sense About Homeopathy* in great detail in this critique, and shown that it appears to be based on ignorance, incompetence, duplicity and dishonesty. In all it contains at least seventeen major faults which we list below:

1. It fails to define some basic terms (such as ‘disease’, ‘condition’ and ‘effective’).
2. It defines the ‘placebo effect’ but then surreptitiously re-defines it as the complete opposite of the original definition.
3. It uses the term ‘homeopathy’ indiscriminately to mean the system of homeopathy, homeopathic treatment and the medicines used by homeopaths.
4. It ignores five of the seven principles on which homeopathy is based, despite their crucial importance to many of the arguments used. For example, the requirement in homeopathy to treat the ‘totality of symptoms’ invalidates many of the arguments used in this leaflet.
5. It fails to acknowledge or discuss the fact that homeopathy has a definition of effectiveness.
6. It misrepresents potentisation by equating it with dilution, which is only a part of the process, without providing any evidence that the effect of succussion is insignificant.
7. It invents terminology to create distinctions which are never explained, such as that between “disease” and the “symptoms of disease”, and ‘inducing physiological changes’ and ‘working in a clinical sense’.
8. It fails to provide any evidence that the nature of homeopathic treatment is essentially the same as that of placebos.
9. It misrepresents the evidence from randomised controlled trials (RCTs) in order to justify the claim that homeopathic treatment is a placebo.
10. It fails to acknowledge that RCTs are not infallible guides to efficacy or effectiveness, and so cannot be used as the sole basis for categorising a treatment as a placebo.
11. It fails to examine the real problems with designing appropriate RCTs to test homeopathic treatment.
12. It relies heavily on a single meta-analysis (by Shang and others), and not only misrepresents the conclusions of this analysis, but fails to take into account the serious

criticisms levelled at it. These criticisms have subsequently been justified, but the leaflet has not been amended.

13. It also misrepresents the conclusions of four other major meta-analyses.
14. It fails to acknowledge that meta-analyses are inherently subjective, and so constitute an unreliable basis for categorical decisions.
15. It misrepresents other research. For example, research showing that a reduction in stress reduces inhibition of the immune system is claimed to show that placebos can “boost” the immune system.
16. It repeatedly relies on assertions which have no general basis in reality in order to present spurious arguments as though they were significant. Examples include claims that homeopathy works “like a vaccine”, that homeopathy has “a powerful placebo effect”, that people use homeopathy because they “believe” it works.
17. It repeatedly exhibits a fundamental lack of understanding of physiology and orthodox medical practice.

These faults are serious, and they mean that *Sense About Homeopathy* has absolutely no scientific validity and would seriously mislead any member of the public turning to it for reliable information. At the same time, the author, Chris Tyler, was assisted by “Sense About Science advisers” (p. 2), and Sense About Science is the publisher of this leaflet, even though Sense About Science claims to be “a charitable trust to promote evidence and good science for the public” (p.2).

In the light of the fact that Sense About Science has also actively attacked those practising homeopathy in other ways – by supporting initiatives to put pressure on NHS Primary Care Trusts, the British government and even the World Health Organization – the failings of this leaflet appear to be part of a general policy of this charity. Such a conjecture receives further support from the fact that the Managing Director of Sense About Science (Tracey Brown) formerly worked in a PR firm (Register Larkin) which gives advice and support to businesses on reputation management,⁶⁹ and so she is familiar with how reputations can be attacked. All these issues are discussed in more detail in Appendix 6.

In conclusion, we are concerned that *Sense About Homeopathy* is not actually intended “to promote evidence and scientific reasoning in public discussion”,⁷⁰ but has been written deliberately to undermine the credibility and reputation of homeopathy, and to provide support for an organised campaign against a system of medicine legally practised in the UK, including within the NHS.

Appendix 1: Homeopathy and the placebo effect

In order to claim that the effects of homeopathic treatment are the placebo effect, there must be good evidence that the mechanism used and its effects are clearly equitable with what is known about placebos and the placebo effect.

Homeopathic treatment must be shown to be inert

The ‘placebo effect’ is the name given to effects observed after a treatment has been given which is inert, so for homeopathic treatment to be a placebo, it has to be proved inert, both in respect of the medicines used and in respect of the relationship of the action of the medicines to the patient’s symptoms. The issue of the relationship of similarity between the causative actions of substances and the signs and symptoms experienced by patients (“like cures like”) is addressed in Appendix 3, and it shows that such a relationship of similarity does not render a medicine inert. As regards the actual medicines used by homeopaths, some commonly used ones are potentially biochemically active (such as mother tinctures and the lower potencies), so they cannot be guaranteed to be inert. This leaves only the higher potencies as susceptible to claims that they are inert.

In the last decade or so laboratory and basic research studies have shown that highly potentised substances appear to differ from highly diluted substances and that they appear to be biologically active. Although this research it is not yet conclusive, as the Faculty of Homeopathy points out, some of it has been replicated in multi-centre studies prior to 2006:*

One example of a series of in-vitro experiments in homeopathy is the model of the allergic response to antibody using the human basophil degranulation test. The earliest study reported inhibition of degranulation with ultra-molecular dilutions of anti-IgE.⁷¹ These initial experiments did not prove to be reproducible.^{72,73} Subsequent studies using a modified method, and using ultra-molecular dilutions of histamine, have shown positive results however. These findings have been reproduced in several independent laboratories,^{74,75} as well as in a multi-centre series of experiments.^{76,77}

Further information on laboratory and basic research can be found in Peter Fisher’s submission to the UK Parliament’s Commons Science and Technology Committee.⁷⁸

Therefore, taking all these point together, it is no longer scientifically justifiable to assume that highly potentised substances are inert, and so it cannot be assumed that homeopathic treatment is a placebo, but must be proved to be the case.

* We have included the references from this quotation in the notes.

Homeopathic treatment must be shown to produce only expected effects

For the placebo effect to occur the subject must have an expectation of a particular result, which may be positive or negative, and this expectation is considered to be a necessary factor though not a sufficient factor. However, there is no evidence that patients treated homeopathically experience effects specifically related to expectation. On the other hand, there is evidence that patients, including babies, experience effects unrelated to expectation, such as the case described by Roger Daltrey (see p. 23). There is also evidence that homeopaths are uncertain of what to expect from treatment, and that the effects of treatment can produce new information about the case. For example, James Tyler Kent details the implications of 12 different reactions to homeopathic treatment.⁷⁹

Furthermore, there is evidence that animals and plants experience effects, which cannot be related to expectation. For example,

The most robust animal model is the effect of thyroxine on the rate of metamorphosis of frogs. In substantial dose thyroxine increases the rate of metamorphosis, it has the reverse effect in ultramolecular dilution. This effect has been reproduced in multi-centre experiments and by independent workers with different species of frog.⁸⁰

Taking these points together with other evidence from laboratory and basic research, it is not scientifically justifiable to assume that the effect of homeopathic treatment is due to expectation. This means that it cannot be assumed that there is the same factor of expectation in homeopathic treatment as in the placebo effect, and that it is necessary to prove this to be the case.

The effects of homeopathic treatment must not differ significantly from those of placebos.

The placebo effect is considered to be unreliable, usually short-lived and of limited effect size, as Edzard Ernst has pointed out:

there is lots of data to show that placebo effects are notoriously unreliable; somebody who responds today may not respond tomorrow; responses are not large in effect size and they are not usually long-lasting.⁸¹

On the other hand, homeopathy has been found to produce effects which are substantial and long-lasting. According to Witt and others, in a study involving 3,709 people

Patients who seek homeopathic treatment are likely to improve considerably. These effects persist for as long as 8 years.⁸²

Therefore it is not scientifically justifiable to assume that the effect of homeopathic treatment is minor or short-lived, and so it cannot be assumed that the effect of homeopathic treatment does not differ in type from the placebo effect, but it must be proved to be the case.

The placebo effect cannot explain homeopathy

Finally, there is no scientific explanation for the placebo effect, a point made by the Secretary of State for Health in July 2010, in response to the Commons Science and Technology Committee, when he stated that

We note, however, that a ‘proper understanding of the power and complexities of the placebo effect’ is difficult to achieve, since we are not aware of any scientific consensus at present on the mechanisms by which placebos have an effect.⁸³

Therefore the placebo effect cannot be the basis of a scientific explanation of how homeopathic treatment works, since it is not possible to explain one unknown process by reference to another unknown process.

Conclusion

On the basis of the above points, it is unscientific to claim that the effects of homeopathic treatment are the placebo effect, as there is insufficient evidence that homeopathic treatment is a placebo, insufficient evidence that the effects of treatment are consistent with those of the placebo effect, and no scientific explanation of the placebo effect. Claims that homeopathic treatment is a placebo, therefore, actually rely solely on the results of some RCTs, but the results of RCTs as a whole are inconclusive, and assessment of their significance requires close attention to the problems of trial design.

Appendix 2: Problems with RCTs of homeopathic treatment

In the context of the lack of clear evidence that homeopathic treatment is inert, or that its effects closely resemble the placebo effect in type and their relationship to expectation, the argument that homeopathic treatment is a placebo depends exclusively on the results of randomised controlled trials (RCTs). This evidence, however, has proved to be inconclusive, with many high and low quality trials indicating that homeopathic treatment is better than placebo, whilst others indicate that it is not significantly better than placebo. The one certain conclusion which can be derived from this is that such trials are not infallible, and so it is important to consider what problems may lead to the contradictory nature of these results.

Intention to treat

To begin with there is a problem with the ‘intention to treat’, which has to be declared in advance of a trial, but which will be affected by at least three factors in a trial of homeopathic treatment. The first of these is the fact that what is being treated is a composite of everything which the person themselves, those near to them and the homeopath identify as being wrong, which will, as a result, be unique for each patient in the trial. Secondly, what can actually be treated at the time of the trial will also depend on the relationship of the symptoms being treated to the medical history, since homeopaths treat signs and symptoms not in themselves or as a state but as part of a process, recognised formally in Hering’s ‘law of cure’. Thirdly, the likelihood of successful treatment increases with the individuality of the patient’s symptoms, but this individuality can be reduced as a result of factors such as the use of some prescription and non-prescription drugs or serious pathology, making it much more difficult to identify the correct homeopathic prescription.

Failure to take these factors into account will mean that in a proportion of cases, which can be as high as 100%, the wrong medicine is used, or the wrong signs and symptoms are being treated, or the appropriate medicine is only identified after others have been tried and failed. This is not a hypothetical situation, since such failures have been identified as actually occurring. In the case of a trial of *Arnica montana* in 1978,

an analysis of the results in a highly critical and objective review of homeopathic research [showed that] only one patient presented typical Arnica symptoms and was included in the placebo group!⁸⁴

In this example, a failure to take account of only the first of the factors we have identified led to the trial actually comparing a placebo in the verum arm (that is, an inappropriate treatment without even biochemical effects) with a placebo in the control arm.

This problem is still a continuing one, as can be seen in the re-analyses of the meta-analysis by Shang and others. Lüdtke and Rutten noted that “Shang’s negative results were mainly influenced by one single trial on preventing muscle soreness in N = 400 long-distance runners”.⁸⁵ However, Rutten and Stolper commented that “As treatment of healthy individuals is very rare in homeopathic practice this outcome has low external validity to judge the effect of homeopathy as a method”.⁸⁶ In addition, the trial was of a generalised condition rather than an individualised one, which, as we have pointed out, seriously reduces the likelihood of selecting the right treatment.

Effectiveness of treatment

The second problem involves the definition of effectiveness, which also has to be declared ahead of the trial, and which also will be affected by at least two factors in a trial of homeopathic treatment. The first of these is the fact that homeopathy defines improvement in relation to Hering’s ‘law of cure’, and a significant improvement as part of the process of recovery may involve a change in symptoms, rather than a simple reduction in symptoms. Secondly, the rate of any improvement after appropriate homeopathic treatment will vary according to the medical history of each patient and other factors, such as stress and current or previous use of some prescription or non-prescription drugs (including the oral contraceptive pill).

Trials based on acute infections and using individualised treatments offer the easiest way to resolve these complex issues of defining effectiveness, since a comparison can be made between the severity and duration of symptoms in the verum and control groups. The historical evidence of the difference between the mortality rates after orthodox and homeopathic treatment for cholera in London in 1854-5 is an example of what was in effect an impromptu trial, although one not involving ‘blinding’ or systematic randomisation. In this case the mortality rate was extraordinarily low (33.3%) compared with contemporary orthodox treatment (61.9%) or with the mortality rate without treatment (50-60%).⁸⁷

In the light of this, it is interesting that homeopathy has been shown to be effective in treating upper respiratory tract infections. Thus, “Shang et al’s 110 trials included 8 of homeopathy for

acute upper respiratory tract infection, with no evidence of quality bias and a considerable effect size, OR = 0.36, 95% CI: 0.26–0.50”.⁸⁸

Conduct of trials

Finally there is the problem of how researchers manage issues which could affect the course of the trial, especially in trials where chronic conditions are being treated. Issues relevant to this problem include external factors which can influence treatment, changes of prescription, practitioner competence, timescales and drop-out of subjects, though some of these are interconnected. Among the external factors which can influence treatment are concomitant drug therapy, emotional shocks (both positive and negative) and physical accidents, since these may limit the way treatment can proceed (in the case of concomitant drug therapy), or require a change of treatment to deal with the new circumstances before it is possible to continue with the treatment being tested in the trial (in the case of shocks and accidents). Clearly, all these can impact on the timescale of the treatment in those patients.

In chronic cases, the process of change in the symptoms tends to lead to more than one prescription being made, involving a change of medicine or of potency. Restriction of a trial to a single medicine or potency will prevent proper treatment according to homeopathic principles. At the same time, the decision about such changes is directly dependent on the information gathered from the reaction to previous prescriptions, so if the practitioner is unaware of whether the patient has actually received the prescription or a placebo, these decisions may be based on false assumptions, both in the control arm, where it will have little effect on the outcome, and the verum arm, where it could have a significant effect. The reason for this involves the factor of practitioner competence.

Because homeopathic practice is a skill, it is necessary to make sure that those practitioners involved in trials are sufficiently competent. However, a more experienced and competent practitioner is more likely to react to the failure of a prescription to act as expected (especially if such a failure to act is repeated) by assuming that the patient is receiving placebo, even though the cause may be a mistake in the selection of the medicine due to some complexity of the case. As a result, there is a risk that the practitioner may fail to take non-reaction in the verum arm of the trial as an important datum in the selection of a prescription.

Drop-out from trials is also an important factor, as it can occur from both the success of treatment and the failure of treatment. Anecdotal evidence abounds of cases where patients have not returned to a homeopath after their first prescription because they were completely well again and so saw no need to return. Secondly, a ‘homeopathic aggravation’ of the case (see Appendix 3) may be sufficiently severe to cause the patient to decide not to continue treatment, even though they subsequently see a sustained improvement in their condition. Thirdly, progress toward recovery in chronic conditions may be very slow as a result of previous treatment or patient pathology, and the patient may decide to discontinue treatment as a result.

Outcome studies

From this analysis it can be seen that models for trials of homeopathic treatment which do not take into account the full principles of homeopathy can be seriously flawed, explaining why even those trials which are good by pharmacological standards may produce contradictory results.⁸⁹ The models proposed by public figures hostile to homeopathy, such as Simon Singh and Edzard Ernst,⁹⁰ Ben Goldacre⁹¹ and Richard Dawkins,⁹² avoid engaging seriously with the details of what is needed in an RCT of homeopathy, and attempt to simplify the process to a comparison of the outcomes in patients receiving a single homeopathic prescription (which may be repeated) with those in a parallel placebo group. This approach implicitly assumes that the homeopathic prescription determines what will happen (as is the case in a chemically active drug), whereas the homeopathic treatment appears only to trigger a response, the course of which is determined by the individual patient’s ability to regain health. It can be thought of as the difference between counting the number of goals scored by one player in a penalty shoot-out and the teamwork involved in playing a football match.

On the other hand, outcome studies, such as the one conducted at Bristol Homeopathic Hospital,⁹³ provide information about the results of treatment in circumstances which do not limit the scope of homeopathic practice, and these can be compared with the normal expectations of benefit in the community at large, both without treatment and with orthodox treatment, as in the example of the cholera epidemic. Several such studies, on different scales and in different countries, have consistently indicated that around 70% of people benefit from homeopathic treatment:

Homeopathic intervention offered positive health changes to a substantial proportion of a large cohort of patients with a wide range of chronic diseases.⁹⁴

In 65% of patient cases, GPs documented a health improvement, with a high degree of correlation between GP and patient assessment of health improvement (source, project monitoring data). ... Large improvements were seen in patients using homeopathy.⁹⁵

... a significant number (26/35: 74%) of patients reported a positive outcome from their treatment. Within this group 15% experienced complete remission of their problem.⁹⁶

...seven out of ten patients visiting a Norwegian homeopath reported a meaningful improvement in their main complaint 6 months after the initial consultation.⁹⁷

1283 adults (67.4% of the study population, 48.7% of all responders) and 655 children (80.0%/61.0%) experienced a clinically relevant treatment success, defined as an improvement of complaint severity of 2 pts or more.⁹⁸

Eighty-six patients (75%) responded sufficiently to homeopathy, and 25 (22%) needed MPD.⁹⁹

Conclusion

Overall, RCTs have to be very well designed if they are to be used to determine whether or not homeopathic treatment is a placebo, especially as design failures, whether from ignorance or intention, can easily undermine the evidence for homeopathy in such trials. On the other hand, outcome studies seem to indicate a consistently high rate of benefit from homeopathic treatment, and laboratory research (see Appendix 1) also suggests that potentised substances are biologically active. As a result, the evidence from RCTs cannot be taken simply at face value, and the ambiguous results cannot be assumed to mean that homeopathic treatment is a placebo.

Appendix 3: Evidence for the ‘Law of Similars’ from orthodox medicine

In pharmacology it is recognised that a substance which is harmful at one dosage may be beneficial at much smaller dosage (hormesis or the Arndt-Schulz law), so in principle orthodox pharmacology does not conflict with the idea that “like cures like”.

The homeostatic nature of the human organism means that it reacts to correct for any stimulus which takes bodily function outside its ‘normal’ limits, which, in the case of illness, will include the signs and symptoms of the illness. A stimulus which acts counter to those of the existing signs and symptoms will, therefore, tend to produce a reaction which reinforces the pre-existing conditions, as shown by the ‘rebound effect’ on the withdrawal of some drugs. On the other hand, a stimulus which produces effects which mimic existing signs and symptoms would tend to produce a reaction counter to the stimulus *and* the existing conditions. The occurrence of the homeopathic aggravation, where the symptoms briefly worsen after the medicine is taken, followed by an extended period of improvement is consistent with this analysis. In principle, therefore, our understanding of biology does not conflict with the idea that “like cures like”.

In orthodox medical practice some treatments involve a relationship of similarity between the treatment and the condition, including vaccination and desensitisation treatment for allergies. Whatever the precise mechanisms of action of these treatments, the principle they have in common is one of similarity.

Some orthodox medical drugs also exhibit a relationship of similarity between the symptoms they can cause and the symptoms they are used to treat. In the case of digitalis “the therapeutic dose is dangerously close to the lethal dose”,¹⁰⁰ and the action of drugs derived from digitalis have a relationship to the condition such that “It can sometimes be difficult to distinguish between toxic effects and clinical deterioration because symptoms of both are similar”.¹⁰¹ Similarly, hyperactivity in children is treated with a stimulant, since “CNS [central nervous system] stimulants should be prescribed for children with severe and persistent symptoms of attention deficit hyperactivity disorder (ADHD)”.¹⁰²

Other orthodox medical drugs are derived from substances used by homeopaths, and the same patient going to either an orthodox practitioner or a homeopaths could receive essentially the same

substance from either practitioner, such as quinine (*Cinchona*), gold (*Aurum*), nitroglycerine (*Glonoïn*), ephedrine (derived from *Ephedra vulgaris*) or ergot derivatives (from *Secale cornutum*). In fact, homeopathy arose from experimentation following the observation that the toxic effects of quinine resemble malaria.

Finally, the principle of “like cures like” cannot conflict with orthodox medical understanding or practice. Orthodox medicine does not identify a consistent relationship between the action of a treatment and the condition being treated, and so there is nothing for this principle to conflict with. Decisions about orthodox medical treatment rely on an empirical approach to effectiveness, and the homeopathic approach is as valid as any other in that context.

In conclusion, the principle of “like cures like” does not conflict with the principles of pharmacology, biology or orthodox medical theory and practice.

Appendix 4: Evidence of the power of homeopathy's scientific approach

One of the tests of a good scientific theory is that it should be able to explain known facts better than before, and that it should be able to predict answers to problems. It is often forgotten that homeopathy was decades ahead of mainstream medicine in a number of areas, and that its claims have been consistently confirmed. The following are some examples of this proven foresight:

1. Homeopathy was the first medical system to fully incorporate the idea that micro-organisms played a role in infectious diseases, some sixty years before Koch observed the cholera bacterium:

On board ships – in those confined spaces, filled with mouldy watery vapours, the cholera-miasm finds a favourable element for its multiplication, and grows into an enormously increased brood of those excessively minute, invisible, living creatures, so inimical to human life, of which the contagious matter of the cholera most probably consists.¹⁰³

2. Homeopathy was the first medical system to propose that such micro-organisms could evolve, some thirty years before publication of Darwin's *On the Origin of Species*:

The fact that this extremely ancient infecting agent has gradually passed, in some hundreds of generations, through many millions of human organisms and has thus attained an incredible development, renders it in some measure conceivable how it can now display such innumerable morbid forms in the great family of mankind.¹⁰⁴

3. Homeopathy was the first medical system to conduct scientific trials of medicines *before* using them to treat the sick:

As regards my own experiments and those of my disciples every possible care was taken to insure their purity, in order that the true powers of each medicinal substance might be clearly expressed in the observed effects. They were performed on persons as healthy as possible, and under regulated external conditions as nearly as possible alike.¹⁰⁵

Therefore medicines, on which depends man's life and death, disease and health, must be thoroughly and most carefully distinguished from one another, and for this purpose tested by careful, pure experiments on the healthy body for the purpose of ascertaining their powers and real effects ...¹⁰⁶

4. Homeopathy was the first medical system to identify the importance of physics ("dynamic energy") to the understanding of living organisms, health and disease, and biophysics is a field still being developed over 160 years after Hahnemann's death:

It is not in the corporal atoms of these highly dynamized medicines, nor their physical or mathematical surfaces (with which the higher energies of the dynamized medicines are being interpreted but vainly as still sufficiently material) that the medicinal energy is found. More likely, there lies invisible in the moistened globule or in its solution, an unveiled, liberated, specific, medicinal force contained in the medicinal substance which acts dynamically by contact with the living animal fibre upon the whole organism (without

communicating to it anything material however highly attenuated) and acts more strongly the more free and more immaterial the energy has become through the dynamization.

Is it then so utterly impossible for our age celebrated for its wealth in clear thinkers to think of dynamic energy as something non-corporeal, since we see daily phenomena which cannot be explained in any other manner?¹⁰⁷

5. Homeopathy was the first medical system to present a coherent and systematic theoretical approach to health and disease based on extensive academic research and experiment, and continually updated on the basis of further research and experiment.¹⁰⁸
6. Homeopathy was the first medical system to formulate a general law of health and disease (first proposed in 1828) which provides a universal basis for the assessment of changes of health in individuals (Hering's 'Law of Cure'):

Hering's Law holds that as a disease passes from an acute to a chronic form the symptoms move from the surface of the body to the interior, from the lower part of the body to the upper, and from the less vital organs to the more vital. This is also true, in part, for the movement of symptoms in acute disease. Under correct homeopathic treatment this movement is reversed, and the symptoms will then move from the more vital organs to the less, from the upper part of the body to the lower, and from the interior to the skin. Furthermore, they will disappear in the reverse order of their appearance.¹⁰⁹

7. Homeopathy has a history of consciously employing placebos in practice as a check on whether chosen medicines are effective or not:

It has been shown here that the very earliest external placebo-controlled trials of homeopathy to be discovered used placebos modelled on those already in use as part of Hahnemannian practice.¹¹⁰
8. Homeopaths promoted hygiene measures in civilian and military hospitals, some 50 years before Florence Nightingale.¹¹¹

It is also interesting to note that we have come across no argument used against homeopathy today which was not refuted by Hahnemann himself before he died in 1843. At the same time no other general theory of health and disease has emerged. Given the enormous advances in scientific knowledge since then, it is extraordinary that these advances have produced no new arguments for the invalidity of the homeopathic theory of health and disease, or any new general medical theory. In fact, the growing knowledge of the properties of materials, including the very peculiar properties of water, suggest that it is only a matter of time before physics finally supplies an explanation for the effects homeopaths claim to observe, thus confirming the theory of homeopathy.

In the light of these points, it is not unreasonable to claim that homeopathy represents a scientific approach to medicine which may not be complete, but which is of great importance.

Appendix 5: The use of the word 'homeopathy'

The word 'homeopathy' is used indiscriminately in *Sense About Homeopathy* to mean the system of medicine, homeopathic treatment and the medicines it uses, without any clarity about which meaning applies at any given point. The various occasions and the different potential meanings, according to context, are listed below.

1. "*Homeopathy is marketed as a ... treatment ...*" (p. 1)

This gives the impression of meaning homeopathy as a system of medicine, but a system of medicine can not be a 'treatment', so we have assumed that it means homeopathic treatment. It is also possible that it could mean potentised substances.

2. "*... homeopathy acts only as a placebo ...*" (p. 1)

We have assumed that this means homeopathic treatment, though it could mean potentised substances.

3. "*Homeopathy is based on two beliefs ...*" (p. 1)

This is the only occasion in *Sense About Homeopathy* where we feel confident that the word 'homeopathy' means the system of homeopathy (other than in the title).

4. "*... trials have failed to show that homeopathy works*" (p. 1)

This is a particularly complex case, and we have assumed that it means homeopathic treatment.

On the other hand, the intention would appear to be to suggest that the system of homeopathy has been shown not to work, but we do not believe that it is possible to design an RCT to test a medical system, since to do so would require an emphasis on generalisation, whereas RCTs are at their strongest the greater the homogeneity of the cases, and so the trials must have tested individual medicines or homeopathic treatment in specific circumstances. Within orthodox medicine, the failure of any number of individual treatments to show 'effectiveness' (according to orthodox terminology) does not invalidate orthodox medicine, so it is unreasonable to extrapolate a conclusion about homeopathy as a medical system on the basis of ambiguous trial results.

At the same time, it needs to be recognised that Tyler's lack of clarity about the use of the term 'homeopathy' is not unique. As a result, it may well be that the different researchers who conducted these trials themselves used different meanings for the word 'homeopathy' in the published results, or even confused two or more meanings.

5. "... *homeopathy is no better than a placebo*" (p. 1)

We have assumed that this means homeopathic treatment, though it could mean potentised substances.

6. "... *110 homeopathy trials ...*" (p. 1)

We have assumed that this means homeopathic treatment, though it appears intended to mean the system of homeopathy, and it could mean potentised substances. In fact the subsequent assertion that the analysis of these trials showed "no evidence that homeopathic preparations work" suggests that the trials were of potentised substances rather than of homeopathic treatment, but we believe that it is more likely that some trials ostensibly tested homeopathic treatment, and other trials potentised substances. This confusion of different types of trial is one of the problems with meta-analyses. Of greater concern here, however, is the fact that the lack of clarity about terminology means that Tyler is taking trials of a specific aspect of homeopathic practice and presenting them as trials of the system as a whole.

7. "... *the less effective homeopathy appears*" (p. 1)

We have assumed that this means homeopathic treatment, though it could mean potentised substances.

8. "... *homeopathy does not perform any better than placebos*" (p. 1)

We have assumed that this means homeopathic treatment, though it could mean potentised substances.

9. "*People use homeopathy ...*" (p. 2)

We have assumed that this means homeopathic treatment, though it could just as easily mean potentised substances. Whilst many people "use homeopathy" in the sense of consulting a homeopath and being prescribed medicines, others "use homeopathy" in the sense that they buy medicines over the counter and self-prescribe.

10. "... homeopathy, like other placebos, ..." (p. 2)

We have assumed that this means homeopathic treatment, though it could mean potentised substances.

11. "Reports that homeopathy has cured ..." (p. 2)

We have assumed that this means homeopathic treatment, though it could mean potentised substances.

12. "... homeopathy works for animals ..." (p. 2)

We have assumed that this means homeopathic treatment, though it could mean potentised substances or the system of homeopathy.

13. "... studies ... show that homeopathy does not work" (p. 2)

We have assumed that this means homeopathic treatment, though it could mean potentised substances. As before, it may well be that the different researchers conducting these trials have themselves used different meanings for the word 'homeopathy' in the published results, or even confused two or more meanings. The implication that these trials have shown that the system of homeopathy does not work is invalid for the reasons given above (see example 4).

14. "Homeopathy works as a placebo ..." (p. 2)

We have assumed that this means homeopathic treatment, though it could mean potentised substances.

In the end, there is only one occasion in this leaflet where the word 'homeopathy' clearly refers to the system of medicine. However, the use of this term implies on every occasion that it is the system which is meant, even though the context almost always indicates that it is homeopathic treatment which is being referred to. In the discussion of clinical trials, this is particularly misleading, as it gives the appearance that the system has been tested, when in fact only specific potentised substances or treatment circumstances have been investigated. Members of the public who would not assume that the 'failure' of an orthodox drug in a trial invalidates the whole of orthodox pharmacology, are encouraged by this misuse of terminology to believe that the 'failure' of a homeopathic treatment or a potentised substance in a trial invalidates the whole system of homeopathy. As we show in Appendix 2, there are actually many factors other than the system of

homeopathy which can account for the failure of an RCT to show that homeopathic treatment is effective.

Appendix 6: Sense About Science

From 2006 to the present Sense About Science has “supported and encouraged medical scientists to make themselves plain in public discussions about homeopathy”¹¹² on the basis that

In 2006 we reviewed discussion about homeopathy and made two observations:

- (a) That it was believed to contain an active ingredient, and was often confused with herbal medicine (and, related to this, that people were often unaware of the mystical belief in water memory and in “like cures like” on which it is based).
- (b) That because it was supplied on the National Health Service, it was assumed that it “must be effective” and “there must be something in it”.¹¹³

This clearly indicates that Sense About Science was starting from the position that homeopathic treatment is a placebo, even though in 2006, as we have pointed out, the evidence from meta-analyses was in favour of homeopathic treatment being effective. At the same time, an objective scientific view would not be that homeopathy was based on a ‘mystical belief’, but that the mechanism of action needed investigation. As Kleijnen and others put it in 1991,

The amount of positive evidence even among the best studies came as a surprise to us. Based on this evidence we would be ready to accept that homeopathy can be efficacious, if only the mechanism of action were more plausible.¹¹⁴

Sense About Science did not proceed to encourage research projects (to either prove or disprove its position) but instead supported a series of initiatives which would impress its views on the public and decision-makers. One of these was the leaflet *Sense About Homeopathy*, described as “a short public leaflet ... describing homeopathy in a scientific context and exploring why some people think it works”.¹¹⁵ As we have shown, this is not the case, and the leaflet simply propagandises the view that homeopathic treatment is a placebo. In the same year Sense About Science co-ordinated a challenge to the government’s *Medicines for Human Use (National Rules for Homeopathic Products) Regulations 2006*.¹¹⁶ The government has subsequently said that these regulations were intended to bring UK law into step with EU law:

In 2006, the UK introduced the National Rules Scheme, which allows the marketing of homeopathic products, with a strictly limited range of therapeutic indications under European Directive 2001/83, in accordance with the principles and characteristics of homeopathy as practised.¹¹⁷

The response of Sense About Science was that “The MHRA has designed the regulations to respond to pressure from the homeopathic industry, which wants to expand”,¹¹⁸ though we know of no evidence to support this.

Another early initiative supported by Sense About Science specifically targeted decision-makers in NHS primary Care Trusts (PCTs), when

In May 2006, a group of medical specialists, led by cancer surgeon Professor Mike Baum, writing to the medical directors and directors of public health at NHS trusts to draw attention to the provision of homeopathy and the lack of evidence in support of its efficacy. ... This letter was followed one year later with a letter led by Professor Gus Born, enclosing a copy of an evidence review by a London NHS trust.¹¹⁹

The second letter was printed on paper with the NHS logo, and led to complaints which resulted in the following statement from the Department of Health:

A document entitled “Homoeopathic Services” which was distributed to Directors of Commissioning earlier this year has caused some confusion because it carried the NHS logo. We would like to clarify that this document was not issued with the knowledge or approval of the Department of Health and that the use of the National Health Service logo was inappropriate in this instance.¹²⁰

In other words, Sense About Science supported an initiative which deliberately over-stated the authority of those putting the case against homeopathy.

In 2006 Sense About Science also sought media attention by claiming “to warn the public that homeopathic medicines offer no protection against malaria or other serious tropical diseases”.¹²¹ This was not based on any systematic research, but on “a short investigation by Sense About Science, which showed that the first ten homeopathic clinics and pharmacies selected from an internet search and consulted were willing to break public health protocols by providing unproven homeopathic pills to protect against malaria and other tropical diseases such as typhoid, dengue fever and yellow fever”.¹²² The true scale of this alleged “problem” has never been researched or scientifically assessed, and the repetition of the ‘sting’ operation by the BBC *Newsnight* programme has not resulted in any convictions. Nonetheless it has been used to attack the credibility of the Society of Homeopaths, which is the largest organisation of homeopaths in Europe (most recently in *Newsnight* on 4 January 2011), despite the fact that no members of that organisation were implicated, and the organisation has guidelines advising there is no clinical trial evidence for the use of potentised substances for protection against disease.

In 2009 an off-shoot of Sense About Science, Voice of Young Science (VoYS), gathered “comments from directors of WHO disease programmes stating that they do not recommend homeopathy for the treatment of HIV, influenza, TB, Malaria and Infant diarrhoea”.¹²³ Extracts were then combined in a press release and led to headlines around the world of “WHO warns against homeopathy use”, though no such official warning statement has been published by the

WHO. At the same time VoYS sent a letter “to the health ministers of all countries to highlight the WHO’s position on homeopathy and to call on governments to combat its promotion for serious diseases”.¹²⁴ This letter asked that

... you publicise this advice to healthcare agencies in your country and join our effort to combat the promotion of ineffective therapies such as homeopathy (which rarely contains any active ingredient) for these serious diseases.¹²⁵

Collectively, the extracts from the responses of WHO directors used in this letter do not constitute advice or an official warning against the use of homeopathy, but are a series of statements about the WHO guidelines on treatment. Given that homeopathy is not a dominant system of medicine globally, and so expertise will not be widely available, it is hardly surprising that the WHO does not recommend the use of homeopathy. However, to use this state of affairs to construct a perspective of high-level active opposition to homeopathy is to be misleading.

The approach to homeopathy of Sense About Science has shown no signs of moving towards research or an impartial assessment of evidence, but has consistently been hostile to homeopathy. Given that the Managing Director of Sense About Science has a background in ‘reputation management’ at Register Larkin, where she was “responsible for developing tailored forecasting and risk issue analysis”,¹²⁶ it looks suspiciously as though she is using her skills not to promote scientific truth, but enable Sense About Science to damage the reputation of homeopathy, a system of medicine legally practised in many countries around the world.

Finally, it may be significant that Sense About Science has received an average of 34.2% of its donation income from the pharmaceutical industry over the last six years, the percentage varying from 27.0% to 56.5%, and the amounts rising from £18,000 in 2004 to a peak of £62,000 in 2008 (see Table 1).¹²⁷ In 2005 Sense About Science received 56.5% of its donation income from the pharmaceutical industry, but in 2006, the year *Sense About Homeopathy* was published and Sense About Science’s campaigning began in earnest, the income from the pharmaceutical industry nearly doubled from the amount of the year before, and was by itself greater than the total donation income of that previous year.

Donor by year	2004	2005	2006	2007	2008	2009	Totals
Amersham			£10,000				£10,000
Association of the British Pharmaceutical Industry	£3,000		£3,000	£3,000	£3,000	£3,000	£15,000
Astra Zeneca	£15,000		£15,000	£15,000	£34,000	£17,000	£96,000
Eli Lilly		£2,000					£2,000
GE Healthcare			£12,000	£12,000	£10,000	£10,000	£44,000
Glaxo-Smith-Kline		£10,000	£13,000	£13,000	£15,000		£51,000
Pfizer		£10,000		£10,000			£20,000
Total from the pharmaceutical industry	£18,000	£22,000	£43,000	£53,000	£62,000	£30,000	£228,000
Total annual donation income	£57,141	£38,940	£146,175	£167,544	£145,902	£111,245	£666,947
Percentage from pharmaceutical industry	31.5%	56.5%	29.4%	31.6%	42.4%	27.0%	34.2%

Table 1: Sense About Science income from the pharmaceutical industry
Source: Published accounts at the Charity Commission

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- ² All unattributed page numbers refer to Chris Tyler, *Sense About Homeopathy* (London: Sense About Science, 2006).
- ³ Simon Singh and Edzard Ernst, *Trick or Treatment? Alternative medicine on trial* (London: Bantam Press, 2008).
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- ⁵ Samuel Hahnemann (trans. William Boericke MD), 1842, *The Organon of Medicine*, manuscript of 6th German edn, 1st English edn 1921; repr. edn 1972 (Roy Publishing House), § 270, p. 272.
- ⁶ The figures for health spending are discussed in William Alderson, *Halloween Science* (Stoke Ferry: Homeopathy: Medicine for the 21st Century, 2009), pp. 12 and 122-123.
- ⁷ W. F. Bynum, *Science and the Practice of Medicine in the Nineteenth Century* (Cambridge: Cambridge University Press, 1994), p. xi.
- ⁸ Henrik R. Wulff, Stig Andur Pedersen and Raben Rosenberg, *Philosophy of medicine: an introduction* (Oxford: Blackwell Scientific Publications, 1986), p. 43.
- ⁹ This point was also made by the British government in its response to a report of the House of Commons Science and Technology Committee: "We note, however, that a 'proper understanding of the power and complexities of the placebo effect' is difficult to achieve, since we are not aware of any scientific consensus at present on the mechanisms by which placebos have an effect." (*Government Response to the Science and Technology Committee report 'Evidence Check 2: Homeopathy'*, presented to Parliament by the Secretary of State for Health by Command of Her Majesty, July 2010).
- ¹⁰ Simon Singh and Edzard Ernst, *Trick or Treatment? Alternative medicine on trial* (London: Bantam Press, 2008), p. 62.
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- ¹³ Robert Berkow M.D. (Editor in Chief), *Merck Manual of Medical Information* (New York: Simon and Schuster, 2000), p. 26.
- ¹⁴ That this applies to the placebo effect too is a point made in Simon Singh and Edzard Ernst, *Trick or Treatment? Alternative medicine on trial* (London: Bantam Press, 2008), p. 62.
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- ¹⁶ Thus the use of the Celsius and Fahrenheit scales of temperature may be handy in everyday life, but they are based on arbitrarily chosen zeros; for scientific calculations it is necessary to use the Kelvin scale, based on an absolute zero.
- ¹⁷ These are discussed in William Alderson, *Halloween Science* (Stoke Ferry: Homeopathy: Medicine for the 21st Century, 2009), pp. 57-62.
- ¹⁸ Samuel Hahnemann (trans. William Boericke), *Organon of Medicine*, 6th edn, manuscript completed 1841, 1st English edn 1921 (Calcutta: Roy Publishing House, repr. edn 1972), § 7 n. 3, p. 93.
- ¹⁹ Samuel Hahnemann (trans. William Boericke), *Organon of Medicine*, 6th edn, manuscript completed 1841, 1st English edn 1921 (Calcutta: Roy Publishing House, repr. edn 1972), §§ 9-12, 15 and notes, pp. 95-99 and 100.
- ²⁰ Samuel Hahnemann (trans. William Boericke), *Organon of Medicine*, 6th edn, manuscript completed 1841, 1st English edn 1921 (Calcutta: Roy Publishing House, repr. edn 1972), §§ 6-7, pp. 93-94.
- ²¹ Samuel Hahnemann (trans. William Boericke), *Organon of Medicine*, 6th edn, manuscript completed 1841, 1st English edn 1921 (Calcutta: Roy Publishing House, repr. edn 1972), §§ 61 and 70, pp. 141 and 149-150.
- ²² Samuel Hahnemann (trans. William Boericke), *Organon of Medicine*, 6th edn, manuscript completed 1841, 1st English edn 1921 (Calcutta: Roy Publishing House, repr. edn 1972), § 273, p. 276. Over time, it has been found that some medicines used in homeopathy work better when used together in certain circumstances, but this can only be discovered empirically, and cannot be reliably predicted.
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- ²⁴ Samuel Hahnemann (trans. William Boericke), *Organon of Medicine*, 6th edn, manuscript completed 1841, 1st English edn 1921 (Calcutta: Roy Publishing House, repr. edn 1972), § 269 and notes, pp. 268-270.

- ²⁵ The *British National Formulary* devotes a considerable amount of space to interactions, see <<http://www.bnf.org>>.
- ²⁶ The theoretical development is discussed in William Alderson, *Halloween Science* (Stoke Ferry: Homeopathy: Medicine for the 21st Century, 2009), pp. 42-43.
- ²⁷ The initial development of homeopathy and Ernst and Singh's version of it are discussed in William Alderson, *Halloween Science* (Stoke Ferry: Homeopathy: Medicine for the 21st Century, 2009), pp. 41-42.
- ²⁸ Henrik R. Wulff, Stig Andur Pedersen and Raben Rosenberg, *Philosophy of Medicine: An introduction* (Oxford: Blackwell Scientific Publications, 1986), p. 77.
- ²⁹ Henrik R. Wulff, Stig Andur Pedersen and Raben Rosenberg, *Philosophy of Medicine: An introduction* (Oxford: Blackwell Scientific Publications, 1986), p. 80.
- ³⁰ Staphylococcal pneumonia, gram-negative bacterial pneumonia, pneumonia caused by *hemophilus influenzae*, legionnaire's disease, mycoplasmal pneumonia, chlamydial pneumonia, psittacosis, viral pneumonia, fungal pneumonia, pneumocystis pneumonia, and aspiration pneumonia (Robert Berkow (Ed. in Chief), *The Merck Manual of Medical Information* (New York etc.: Simon and Schuster, 2000), pp. 194-200).
- ³¹ For example, idiopathic juvenile osteoporosis, idiopathic torsion dystonia, and ideopathic thrombocytopenic pupurea, see Robert Berkow (Ed. in Chief), *The Merck Manual of Medical Information* (New York etc.: Simon and Schuster, 2000), pp. 219, 315 and 756. Other terms may be used, as in essential tremours, see Robert Berkow (Ed. in Chief), *The Merck Manual of Medical Information* (New York etc.: Simon and Schuster, 2000), p. 311.
- ³² Henrik R. Wulff, Stig Andur Pedersen and Raben Rosenberg, *Philosophy of Medicine: An introduction* (Oxford: Blackwell Scientific Publications, 1986), p. 94.
- ³³ Robert Berkow (Ed. in Chief), *Merck Manual of Medical Information: Home edition* (New York: Simon and Schuster Inc., 2000), p. 914
- ³⁴ *MacRepertory* 8.0.3.10 Classic (Kent Homeopathic Associates, 1985-2003) lists 240 remedies which appear in both the following rubrics: Eyes; LACHRYMATION and Nose; CORYZA; Discharge; with, fluent.
- ³⁵ *MacRepertory* 8.0.3.10 Classic (Kent Homeopathic Associates, 1985-2003) lists only 8 remedies which appear in both the following rubrics: Eyes; DISCHARGE; Bland and Nose; DISCHARGE; Acrid, corrosive, excoriating, and only 2 which appear in both the rubrics: Eyes; DISCHARGE; Acrid, corrosive, excoriating and Nose; DISCHARGE; Bland.
- ³⁶ Dr Frederick Schroyens (ed.), *Synthesis: Repertorium Homoeopathicum Syntheticum* (London: Homeopathic Book Publishers, 2001), pp. 315-410.
- ³⁷ See, for example, Allen Stevens and James Lowe, *Pathology* (London: Harcourt Publishers, 2000), p. 1.
- ³⁸ Samuel Hahnemann (trans. William Boericke), *Organon of Medicine*, 6th edn, manuscript completed 1841, 1st English edn 1921 (Calcutta: Roy Publishing House, repr. edn 1972), §§ 36, 46 and 56 n. 63, pp. 113, 123-125 and 132-133.
- ³⁹ For example, see *British National Formulary* for beta blockers (Section 2.4 'Beta-adrenoceptor blocking drugs'), antiepileptics (Section 4.8.1 'Control of epilepsy'), drugs affecting the renin-angiotensin system (Section 2.5.5.1 'Angiotensin-converting enzyme inhibitors') and so forth, at <<http://www.bnf.org/bnf/bnf/current/>>.
- ⁴⁰ Samuel Hahnemann (trans. William Boericke MD), 1842, *The Organon of Medicine*, manuscript of 6th German edn, 1st English edn 1921; repr. edn 1972 (Roy Publishing House), § 270, p. 272.
- ⁴¹ Michael Emmans Dean, *The Trials of Homeopathy: Origins, Structure and Development* (Essen: KVC Verlag, 2004), p. 10.
- ⁴² Samuel Hahnemann, 'How Can Small Doses of Such Very Attenuated Medicine As Homoeopathy Employs Still Possess Great Power?', from *Reine Arzneimittellehre*, pt vi, ([n. p.]: [n. pub.], 1st edn 1827) in *The Lesser Writings of Samuel Hahnemann* by Samuel Hahnemann (trans. R E Dudgeon), 1851 edition (New Delhi: B. Jain Publishers, repr. 2002), p. 728-734.
- ⁴³ E. Ernst and M.H. Pittler, 'Re-analysis of previous meta-analysis of clinical trials of homeopathy', *Journal of Clinical Epidemiology* 53 (2000), 11.
- ⁴⁴ Ben Goldacre, *Bad Science* (London: Fourth Estate, 2008), p. 53. It should be pointed out that he does not believe these results, but he offers no evidence to support his opinion other than a hypothesis of deception, proposed by Edzard Ernst, and based on the premise that homeopathic treatment is a placebo.
- ⁴⁵ A.L.B. Rutten and C.F. Stolper, 'The 2005 meta-analysis of homeopathy: the importance of post-publication data', *Homeopathy*, 97 (2008), 169-177, p. 175 at <http://www.aekh.at/fileadmin/Bilder/Hom_opathie_int/RuttenStolperHomeopathyarticle.pdf>, accessed 15 April 2009.
- ⁴⁶ Aijing Shang, Karin Huwiler-Müntener, Linda Nartey, Peter Jüni, Stephan Dörig, Jonathan A.C. Sterne, Daniel Pewsner and Prof. Matthias Egger, 'Are the clinical effects of homoeopathy placebo effects? Comparative study of placebo-controlled trials of homoeopathy and allopathy', *Lancet*, 366 (2005), 726-732.

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- ⁴⁹ M. Cucherat, M.C. Haug, M. Gooch and J.P. Boissel, 'Evidence of clinical efficacy of homeopathy: A meta-analysis of clinical trials', *European Journal of Clinical Pharmacology*, 56 (2000), 27–33.
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